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THE GENERALIZING ABILITY OF CHILDREN.

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In an effort to secure more precise information than at present exists in the literature of child psychology on the ability of children to generalize, the critic teachers of the Illinois State Normal University were asked to contribute questions requiring generalizing which in their opinion were adapted to the grades which they taught. Certain suggestions were given them: (1) As far as possible put the material on which the generalizations were to be based into the questions, and (2) so frame the questions as to restrict the answers to a small range, and thus make them more gradable. From about twenty questions thus obtained eight were selected and tried on all the children of the training school from 10 to 14 years old. To these were added twenty-five 13 and 14-year-old children from the high school department. The children tested had passed their tenth birthday and had not yet reached their fifteenth. These eight questions varied from one that was

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answered by nearly all the 10-year-olds to some that not many of the 14-year-olds answered correctly. We shall report here upon only four questions. Later three of the four were tried in one of the Bloomington schools.

The Questions. **I. In what ways were Roland and Sir Fairhands similar? In what ways are the situations in which they are placed similar? Tell all the ways.**

Sir Fairhands and the maid came to a great city, where they saw many splendid palaces. "See," said the maid, "yonder palace is the dwelling of Sir Persaunt of India, the most powerful knight that you ever saw. You had better flee while yet it is time." "Not so," he made answer, "for if he be a noble knight he will not attack me with all his company, and if he come against me alone I will not refuse to meet him."

As Roland and his rear guard toiled up the mountain ridge they saw a great multitude of soldiers with spears. Then Oliver said to Roland: "What shall we do now? for this is a greater multitude than has ever been gathered together before. And they will certainly give us battle. Be wise, take your horn and sound it, good comrade; perhaps Charles may hear us and come back with his host and rescue us." But Roland answered: "The greater the numbers the more glory. God forbid I should sound my horn. Fear not. I promise you they shall repent of coming here."

II. In what ways are these three sections of North America alike or similar? Tell all the ways. In the New England States the rockiness of the soil makes it poor for farming. There are, however, many rapid rivers there which can be used to run machinery cheaply. Hence this section is chiefly a manufacturing section. In the Western Plateau section between California and the Rocky Mountains the scarcity of rainfall has long made farming impossible in most places, while the large quantities of silver, gold, copper and lead has made mining the leading occupation. The northern part of North America is covered with ice during the long winter, and the summer is so short and cold that little farming can be done. The principal occupations are hunting, fishing and mining. The people are called Eskimos. During the winter they live along the coast, but in summer they move into the interior, because the hunting is better there.

III. In what ways was the work of these men similar? Tell all the ways. Robert Fulton was an American inventor who did a great service to the whole world. He thought steam could be used to propel boats over the water. Few people believed that this could be done, and while he was at work upon his steamboat many ridiculed him, and called his boat "Fulton's Folly." But he paid no attention to this, and finally made a boat that steamed up the Hudson at the rate of five miles an hour.

George Stephenson was an Englishman who invented the locomotive engine. He believed that engines hauling cars over tracks would help very much to increase trade and travel. He worked at his idea many years before people believed that it would be a success. He finally succeeded, however, in making a steam engine, and in 1825 the first railway in the United States was built.

IV. In what ways are these examples alike? Tell all the ways. First solve the examples in writing.

1. **If ½ a farm is worth $600, what is the whole farm worth?**
2. **I sold a cow for $48; this was ⅔ of what I paid for her. Find the cost.**

All four questions were given at a single sitting in mimeograph form. In the elementary school each question was read twice, once by the writer, and once by the pupil. All of the children wrote what they had to say about one question before anyone took up the next. There was no time limit, but the exercise consumed about 45 minutes with the younger children. In the high school there was no reading aloud, and the pupils were allowed to proceed as fast as they pleased. Before beginning the purpose of the test was always explained, and instances of generalizing given. All of the grading of the answers was done by the writer of this study.

Test in University Training School.

Summary of Answers to Question I. For this question the following answers were considered correct: (1) Both men were brave; (2) they were opposed by great numbers; (3) both were advised not to fight, and (4) both refused the advice. Other correct answers were occasionally offered by the children, but not often. Nearly all of the 10 and 11-year-old children, as well as those older, gave the first answer, and a large number gave the second. To the third the children were apt to say that both men were advised to flee (an error). The third and fourth were too difficult for the younger children, but were adapted to those 13 and 14 years old.

Two differences between the younger and the older children were noticeable. The younger children tended to pick out statements from the text expressing a resemblance, while the older children more often give the essence of the resemblance in their own words, for example, "These two men are not afraid and they say fear not when the maid said flee away, and when Oliver said blow your horn." (10 years.) "Sir Fairhands would not go away, and Oliver would not blow his horn." (10 years.) "Neither would flee when in danger." (13 years.) "Their comrades told them to flee but they would'nt do it." (13 years.) "They both stay." (13 years.) "Neither would take the advice from their comrade." (14 years.)

The second difference was that the younger children gave fewer generalizations per question. Even when urged to look for more, they were usually content with one. Both of these differences appeared in the answers to all four questions.

Questions II-IV were more successful, and are reported more fully. The answers were graded.

Summary of Answers to Question II. The answers to this question which were considered correct were: (1) That farming is poor in all three sections, and (2) in all three sections there are natural resources from which the people make a living. Sometimes other correct answers were given, in which case, unless they concerned insignificant aspects, they were allowed credit in the column called Additional Generalizations in the table which follows. This table shows the average per cent. correct of each age-group in each generalization. Only three grades were given: correct or substantially correct, 1 point; partly correct, ½ point; substantially or entirely wrong, or nothing said, 0. The table should be read: the 10-year-old children, of which there were 34, averaged 47 per cent. on the Poor Farming generalization, and 19 per cent. on the notion that each section has some resources from which the people make a living. Enough additional generalizations were made to give the group an average of 21 per cent., allowing 1 point for each generalization.

TABLE 1.—*Results at University Training School.*

		II. Geography.			III. Inventions.			IV. Arithmetic.		
Age.	No.	Poor Fmg.	Other Occps.	Addl. Gens.	Steam Convey.	Dbt. & Pers.	Pub. Ben.	Wk.	Gen.	Av. Grade.
		%	%	%	%	%	%	%	%	%
10.....	34	47	19	21	26	51	26	43	12	30
11.....	30	77	22	7	38	60	47	47	33	46
12.....	38	63	25	24	38	64	41	45	43	46
13.....	34	81	40	38	41	79	38	68	37	53
14.....	50	87	45	52	57	70	46	63	48	59

The table shows that the generalization concerning the difficulty of farming is adapted to 11-year-old children because three-fourths of them make it correctly. The second general-

ization is more difficult, for reasons that will be mentioned shortly, and the averages at all ages were much lower. Of those who failed completely a few said nothing or repeated the text. More give a false generalization such as "All three sections mine," or "All three manufacture." A few of the younger children grasp vaguely the idea of the second generalization. "Something is possible in all three sections"; "there is something in the lead"; "all three have something right and something wrong"; "other occupations are going on"; "they all make money in their work and it is all worth while." All of these answers were given by 10-year-old children. Each was given half credit, except the first, which received full credit.

The 13 and 14-year-olds do better. The 13-year-olds say "No section is fit for farming, but something else can be done." "They all have good occupations for where they are located." "Nature is made use of in all." The 14-year-olds say "There are certain conditions in each section which allow the people to make a living." "They all follow occupations most suited to the climate and natural conditions of the country." "Farming is not practical because of the conditions, but all have different resources, and make that which is most suited to their means their occupation." "They all have some means by which they can work." "In all they can make a living." All these answers received full credit. This generalization is difficult for two reasons. First, the differences in occupations are thrown into the foreground, their dependence on resources is in the background. Secondly, the child must find both the concept and the language expressing what the regions have in common. There is no expression in the text describing one locality which the child can apply to all.

I have already said that the increase in the number of generalizations per question is one of the changes with age. It may be well to give at this point some which were not planned by the author of this question. "The abundance or scarcity of water vitally concerns each section. Each section has many forms of the leading occupations, as lead, gold and silver mining, boot, shoe, cloth and machinery manufacturing, seal, bear and elk hunting." (14 years.) "All three sections are

rocky.'' (13 years). ''Each contributes something necessary to the world.'' (13 years.) ''The ground in each is either rock or ice, not soil.'' (13 years.) These are credited in the table under the head of Additional Generalizations to the Geography Question. The increased breadth of survey is due to several causes, particularly to instruction and greater fluency in reading.

Summary of Answers to Question III. This question was framed to allow three generalizations. (1) Both men invented a means of travel by steam, (2) both succeeded in spite of public disbelief, and (3) both inventions were of great benefit to the public. The first and second easily fall into two subdivisions each; the first, into improvement of means of travel, and the motive power, steam; the second, into the persistence of the inventors, and the scepticism of the public. Half credits were allowed for these. The second of the three was made by considerably more children than either of the other two, and this probably means that it is easier. The increase from 51 to 79 per cent. (see Doubt and Persistence column of the table) was only slightly an improvement in grasp, and almost wholly an improvement in the number of children who mentioned the matter at all.

With the notion that both men invented a means of travel by steam it was otherwise. There was a decided improvement in comprehension with age. While it was easy to see that steam was used in both inventions, it was not easy to find an idea that would include both boat and locomotive. The most common way of putting it was to say that both inventions increased trade and travel, a phrase borrowed from the description of Stephenson's invention. Over half of all the 10-year-olds (56 per cent.) omitted the steam conveyance point entirely. The same is true of 50 per cent. of the 11-year-olds, 45 per cent. of the 12-year-olds, 29 per cent. of the 13-year-olds, and 16 per cent. of the 14-year-olds. The following are typical answers: Ten-year-olds: ''The work of these two men was traveling''; both were interested (sometimes 'had faith in' or 'worked with') steam''; ''each tried to get steam to work''; ''both tried to make an easier way to travel.'' A number of various ages spoke of one running by steam on land and

the other on water, showing a failure to find the rest of the common trait. These are the best answers of the 10-year-olds. Each received half credit. The 12-14-year-olds are more successful. Some of the 12-year-olds say: "both thought steam could push things"; "both worked with steam to make things travel"; "one built a water and the other a land steamer"; while among the answers of the 14-year-olds are "both made something that was propelled by a steam engine"; "both made steam inventions that tended to increase trade and travel"; "both based their energies on using steam for their power, and on carrying freight"; "both thought that steam might help men as a means of transportation"; "both inventions used steam for power and were an aid to travel"; "both had the idea of using steam as a propelling power."

The third generalization from Question III is that both inventions were a great benefit to the public. This was not difficult. The text gives the hint in the words "Fulton did a great service to the whole world." All that had to be done was to see that the phrase applied to both men. In one way this point was difficult to grade, because of occasional overlapping of this and the first generalization, *e. g.*, it was hard to classify the expression "both men helped trade and travel."

Very few additional generalizations not foreseen by the authors of the question were given by the children in the Invention Question, and no report is made upon them in the table. Many said that both men were inventors, but this was too obvious.

Summary of Answers to Question IV. This question gave two examples in arithmetic in both of which part of a sum was given and the sum required. Altho the working of the examples was required, the only thing for which credit was given was the generalization just referred to. If the generalization was correctly given, but the arithmetic was wrong, credit was nevertheless allowed. The percentages of children who worked *both* examples correctly are given in column 9 of Table I. Such examples are taught in the fifth grade in this school, the average age of which is 10.7 years. The results are given in columns 9 and 10 of the table, column 10 giving the percentages of correct generalization for each age. They

are not as high as had been expected by the writer. It should be stated that such answers as that both examples contained multiplication, or that both dealt with fractions, or dollars, or agricultural matters received no credit. Half credit was allowed for saying that part of the cost or worth was given, or for saying that the whole cost or worth was required. Apropos of agricultural matters, one little girl replied that there was usually a cow on the farm!

Test in Bloomington, Illinois, Schools.

The II, III and IV Questions were later given under the same conditions to all the children 10-14 years old in the Franklin Public School of Bloomington, Ill., and to 23 of the 13-14-year-old pupils of the Bloomington High School. All the tests were conducted by the writer. Table 2 gives the results:

Table 2.—*Results at Bloomington, Illinois.*

		II. Geography.			III. Inventions.			IV. Arithmetic.		
		Poor Fmg.	Other Occps.	Addl. Gens.	Steam Convey.	Dbt. & Pers.	Pub. Ben.	Wk.	Gen.	Av. Grade.
Age.	No.	%	%	%	%	%	%	%	%	%
10.....	38	56	9	32	24	25	16	21	20	25
11.....	27	67	6	26	27	33	24	22	28	32
12.....	39	82	13	64	31	63	41	56	42	45
13.....	45	80	37	64	46	80	49	76	49	57
14.....	24	80	30	79	50	71	41	92	54	52

A comparison of these results with those obtained in the University Training School shows a slight superiority in the latter. It was somewhat the better in the second Geography generalization, and in all three of the Inventions generalizations, while the Bloomington schools were the better in the Arithmetic question. The last is probably due to more drill in the Bloomington school. The higher percentages of correct solution of the examples points to this interpretation. A number of the Bloomington papers, possibly a dozen, actually quoted the rule in arithmetic under which the examples came. This did not occur among the Normal papers.

Why the 14-year-olds in Bloomington were no better than

the 13-year-olds I am unable to say. It might be thought that there was a smaller proportion of high school students among the 14-year-olds at Bloomington than at Normal, but this is not the case, just 50 per cent. of the 14-year-olds in both groups being in the high school.

Conclusion. The main value of this study, in the opinion of the writer, lies in the concrete picture which it gives of some of the generalizations which children make. Summarizing, we may say that the generalizations concerning the courage of the two soldiers in the face of greater odds, the one concerning the difficulty of farming in certain sections of North America, those concerning the scepticism of the public as to the probable success of the inventors, and the splendid persistence of the latter can be made by 50 per cent. of the children 10-11 years old, and by 75 per cent. of the 12-year-old children. When 75 per cent. can answer a question correctly, it is suited to that age. We may say that the generalizations that Fulton and Stephenson invented means of travel by steam, and that both inventions were of great benefit to the public, and the arithmetical generalization are too difficult for the younger children but can be made by about 50 per cent. of children 14 years old. The hardest generalization in the exercise was the one concerning the occupations of the several parts of North America. It should be borne in mind, however, that, in class teaching where the work advances to a new aspect, it represents satisfactory teaching conditions if 50 per cent. of the class can make the generalization correctly. That is to say, 75 per cent. is probably unnecessarily high for this purpose.

It is, of course, a matter of great interest to know how much the ability to generalize improves during these years of later childhood and early adolescence. To throw light on this question was one of the main purposes of the test. It was the motive that prompted our efforts to make the questions genuinely gradable. All of the papers were graded with great painstaking. Inspection of the tables shows that the rate of improvement varies greatly in the different generalizations, being least in the easiest questions. It is tempting to regard the average of the various rates of improvement as a meas-

ure of the improvement in generalizing ability. If this were warranted, the reply to our problem would be that generalizing ability about doubles during the years 10 to 14 inclusive, (see column eleven of Tables 1 and 2). But the limited number of the questions forbids the writer from taking the conclusion to be anything more than an hypothesis. Much, of course, depends on the questions used.

SCHOOL MEASUREMENT.

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It would be hard to overestimate the value of a reliable device for measuring a school system. Is there such a thing in existence? In trying to answer this question one first thinks of the reports of recent educational surveys. Are there in any of them measurements by means of which a school can be evaluated? Let us briefly consider several of them.

The New York City School Survey.

This is by far the most elaborate study that has been made. The reports are interesting and of value to school men in general, but they are naturally concerned almost wholly with New York schools, and contain little that can be applied as scientific measurement to any other school system. "Elementary School Standards" is about the only one of these reports which is applicable to schools in general. This contains the four following valuable standards of instruction:

1. Motives on the part of the pupils.
2. Consideration of values by pupils.
3. Attention to organization by pupils.
4. Initiation by pupils.

As vital as these standards are, there are scores of more measurable factors which go to make up the motives, values, organization and initiation on the part of the pupils. None but experts could apply these criteria and secure results of any value. They are too complicated and abstract to be serviceable in judging a school. These four factors could be employed together with many more as partial determinants, but in themselves they are insufficient.

The Atlanta, Georgia, School Survey.

This was a brief survey made by an outside organization. The report is presented under the following headings:

I. Evidences of progress noted.
II. Weakness in present administration.
III. Defects in administrative records.
IV. Recommendations.
V. Exhibits.

Under part I the following points are noted:

1. Emphasis is placed upon the need for instruction in the practical arts.
2. Evening school work.
3. Increase in lowest salary.
4. Power given the city superintendent to select teachers.
5. Standard of medical examination.
6. Recently built schools follow improved standards.
7. Buildings were clean.

The other parts of this survey are similar in character to part I. Here and there in the report are to be found measuring phases that are applicable to all schools, but there is no method of evaluation presented.

Chicago Educational Commission.

This is strictly a study of the Chicago school system.

Report of the Boston School System Inquiry, by the Finance Commission.

This is a comprehensive study and vindication of the Boston school system. As an example of the contents of the report the following is taken from the index:

Part II. Chapter VI. The Teaching Force.
Section 1. Need of good teachers.
" 2. Presence of inferior teachers.
" 3. New method of appointment.
" 4. Reactions.
" 5. Examination and rating of candidates.
" 6. Boston Normal School pupils.
" 7. Promotional examinations.
" 8. Opportunities for promotion.
" 9. Supervision of new teachers.
" 10. Leave of absence on half pay.
" 11. Age limits.
" 12. Pensions.

Here again are to be found excellent ideas which have a universal interest, but the whole report is without norms and graphs and contains nothing resembling scientific measurements.

Greenwich, Conn., School Exhibit.

This report is full of suggestions which could be applied to many school systems with great profit. Pictures and comparisons make up the bulk of this report, but of course they furnish no measuring scale.

Grafton, W. Va., Survey.

This report is written under the following headings:

Industries and occupations, night classes, sewing, a co-operative plan, the high school, moral education, the commercial department, organization of elementary schools, present time allotment, the cost of elementary textbooks, size of classes, elementary teachers, summary of suggestions, possibilities of consolidation, salary schedule, sanitary conditions, improvement in buildings and grounds, current expenditures, the purchase of supplies, new high school equipment, conclusion.

The following is a typical paragraph taken from this report:

"The sanitary fixtures in the new South Side building are modern and in good condition, but they must be cleaned occasionally if they are to be kept in proper condition. The basement of the West Side is in very good condition, but the toilet bowls ought to be thoroughly scrubbed and the stools painted."

Emporia, Kansas, School Survey.

—This is only a description of the schools by the local men in charge of the various school departments.

Ten Tests of Efficiency by the Russell Sage Foundation.

This is an ingenious and timely device applied to the 48 States, but it is not a practical measuring stick. It is not a test that one could satisfactorily apply to a town or city school system; for, as State Superintendent H. C. Morrison of N. H. says in the December number of Educational Foundations:

"Of the 'ten tests of efficiency' given, but five of them can reasonably be said to enter at all as factors into the question of efficiency of the public school system."

"The number of children in school, the number of school

days per child, the length of the school year, the attendance of children, and the relative proportion in the high school, may reasonably be said to be measures of the extent to which school systems are fundamentally succeeding."

"Such items as expense per child, expenditure in proportion to wealth, daily cost, and salaries, are no doubt extremely interesting as revealing certain phases of educational conditions in the several States. But it is a strange use of language to call them measures of efficiency."

It is evident that none of these reports supplies us with a standard for measurement. They are more after the manner of a stock-taking operation. Every store occasionally needs to take an account of its stock, but the real business of the store is done by the aid of standards of measurement. The real business of the schools must more and more be done in a like manner, but this cannot be expected until we first have the necessary standards and units to work with.

"School and Teacher Measurements," which was published in the May number of this JOURNAL, contains a device for measuring teachers, and now follows a device for measuring the other school factors, under the following heads: 1. Sanitation and Hygiene; 2. Outside Influences; 3. Building and Premises; 4. Equipment; 5. Courses of Study. While there are errors of omission as well as errors of commission in this measuring scale, it is nevertheless a definite attempt to construct something concrete and comparatively simple with which to measure our schools. There was very little to go upon in the working out of this scale. I have tried to incorporate the best school practices, but as the various criteria are so scattered, and so many tests are still in such an unsettled condition, it has not been an easy task. But wherever possible the ideas of the standard authorities have been used.

Measuring Scale.

School Sanitation and Hygiene.

1.	Location of School.	+ Healthful, quiet and attractive. *a* Healthful. — Marshy, smoky, noisy, unattractive. (Any three.)
2.	Cleanliness.	+ Competent janitor in charge—Vacuum cleaner in use—Suitable place for pupils to wash hands —Paper towels. *a* Competent janitor in charge—Suitable place for pupils to wash hands in—Paper towels. — Incompetent janitor—Feather dusters in use.
3.	Closets.	+ Well lighted and ventilated—Sanitary flush closets (one to every 15 girls and one to every 25 boys, together with sanitary urinal)—Entirely separate. *a* Flush closets — Sanitary urinal — Entirely separate. — Vaults.
4.	Light.	+ Windows equal one-fifth of floor space, and all on one side of room, or from above. *a* Sufficient light, but from two sides. — Light from more than two sides or insufficient in amount.
5.	Heat and Ventilation.	+ Indirect method—Air forced by fan or blower—Humidifier. *a* Direct-indirect method. Gravity system of ventilation. — Direct heat—Window ventilation.
6.	Temperature.	+ A temperature of from 68 to 72 degrees constantly maintained—Controlled by janitor. *a* Regulated by teachers or pupils—Variable. — No attempt to control.
7.	Drinking Outfit.	+ Pure water—A good drinking fountain for every 75 pupils. *a* Pure water—Individual drinking cups. — Contaminated water or common drinking cup.
8.	Seats and Desks.	+ All seats single, adjustable and semi-annually fitted to the pupils. *a* All seats single—One-third of them adjustable and semi-annually fitted to the pupils. — Double, non-adjustable seats.
9.	Physical Training.	+ Physical instructor—Playgrounds—Gymnasium. *a* Physical instructor—Playgrounds. — Playgrounds.
10.	Medical Inspection.	+ School physician—School dentist—School nurse for every 2000 pupils. *a* School nurse for every 2000 pupils. — No physician, dentist or nurse.

11.	Outdoor Schools.	+ For all tubercular children. *a* A start has been made. — Nothing.
12.	Lunches.	+ Wholesome free lunches to poor children—Served at cost to all other pupils. *a* Wholesome lunches served at cost to all pupils. — No school lunches served.

Outside Influence.

1.	Home.	+ Parents interested, appreciative and co-operating with the teachers. *a* Parents not actively interested—No interference. — Parents are meddlesome.
2.	Community Life and Attitude.	+ Constructively critical. *a* Indifferent. — Destructively critical.
3.	Public Library.	+ Good list of books—Strong librarian, who co-operates with the teachers and influences the reading of the boys and girls. *a* Good list of books—Poor co-operation between library and school. — The modern novel predominates.
4.	Organizations.	Y. M. C. A.—Boy Scouts—Camp Fire Girls—Church and Sunday-school Clubs, etc., under competent leadership. + 75% of pupils have the benefit of one or more such organizations. *a* 50% of pupils have the benefit of one or more such organizations. — Less than 50% of pupils have the benefit of one or more such organizations.

Building and Premises.

Building.

1.	Material.	+ All exterior and interior walls are made entirely of incombustible materials—Fireproofing in floors and stairways. *a* Exterior walls are made entirely of incombustible material—Inside walls made of wood and plaster. — Wooden building.
2.	Plan.	+ Boston regulation sized rooms—Spacious halls and stairways. *a* Rooms larger than necessary. — Rooms too small.
3.	Architecture.	+ Dignified, Plain and Substantial. *a* Plain and substantial. — Complicated or flimsy.
4.	Condition.	+ Upkeep excellent—Clean and wholesome. *a* Upkeep only fair—Clean and wholesome. — Badly defaced or filthy.

5. **Fire Protection.**	+ Two or more fireproof stairways surrounded by fireproof masonry walls and placed upon opposite sides of the building—Fire extinguishers on every floor. *a* Two or more metal fire-escapes—Fire extinguishers on every floor. — Neither fire-escapes nor extinguishers.
Premises.	
1. Size.	+ Over 1½ acres clear of school building. *a* Between 1 and 1½ acres clear of school building. — Less than 1 acre clear of school building.
2. Appearance.	+ Smooth playground at one side or in rear of building—Good lawn in front. *a* Front appearance good. — Yard barren and rocky.
3. Play Apparatus.	+ Ball field—Tennis courts—Slides, etc. *a* Ball field. — Nothing.
4. Gardens.	+ Flower gardens—Shrubbery—Trees—Pupils' individual gardens. *a* Flower gardens—Shrubbery—Trees. — Trees.

Equipment.

The value of the school equipment is to be estimated by the percental system, using the following as the standard, or 100%:

1. Text Books.	Every child is supplied with all required text books, and they are in good condition.
2. Supplementary Readers.	Every grade room has the use of a set of readers in each of the following subjects: Literature—Geography—History—Nature—Physiology.
3. Maps and Globes.	All rooms above the primary grades have a globe and the following wall maps: Western and Eastern Hemispheres or Map of the World on Mercator's projection—Map of every continent studied in the grade which occupies the room.
4. Blackboards.	Slate boards on 50% of the total running wall space (counting doors and windows).
5. Clocks.	Electric clock in every room, standard time.
6. Thermometers.	One in every room.
7. Bells and Telephones.	Adequate system of bells—Every room is provided with a building telephone.
8. Flags.	One large flag for outside use, and a small silk flag in every classroom.

9.	Pictures and Statuary.	Every room has at least three good framed pictures and one piece of statuary.
10.	Library.	Large dictionary—Atlas—Encyclopedia—Reference books.
11.	Musical Instruments.	There is a piano in the building; also a talking machine for the development of musical appreciation.
12.	Charts.	Every room is furnished with whatever charts are needed in primary reading, music, history, biology, etc.
13.	General School Supplies.	All kinds of paper, pencils, pens, ink, rulers, etc., are supplied free to the pupils for their school work.
14.	Kindergarten Devices.	Blocks, stars, weaving mats, etc., are supplied to all of the primary and kindergarten rooms.
15.	Collections.	There are two or three well-kept (not large, but workable) collections in the school.
16.	Plants.	Every room has a few growing plants in it.
17.	Apparatus.	The school is provided with apparatus for making physical and mental tests.
18.	Special Equipment.	Laboratories, manual training and domestic science rooms, and shops are all well equipped.

Courses of Study.

Elementary Schools. (Applies to the first six grades.)

+ Schools offering all of the B subjects.
a Schools offering two or more of the B subjects.
— Schools offering less than two of the B subjects.

Year.	A. Subjects.	Approximate periods per week.	B. Subjects.	Approximate periods per week.
I.	Reading.	10	Music.	3 to 5
	Writing.	5	Drawing.	2
	Elementary Languages.	5	Handwork.	3
	Number.	5	Nature.	2 to 5
	History Stories.	3	Physical Exercise.	5
II.	Reading.	10	Music.	3 to 5
	Writing.	5	Drawing.	2
	Elementary Languages.	5	Handwork.	3
	Number.	5	Nature.	2 to 5
	History Stories.	3	Physical Exercise.	5

III.	Reading.	5	Music.	3 to 5
	Writing.	5	Drawing.	2
	Composition.	5	Handwork.	3
	Spelling.	5	Nature.	2 to 5
	Arithmetic.	5	Physical Exercise.	5
	History.	3		
IV.	Literature.	5	Music.	3 to 5
	Writing.	5	Drawing.	2
	Composition.	5	Handwork.	3
	Spelling.	5	Nature.	2 to 5
	Arithmetic.	5	Physical Exercise.	5
	History.	3		
V.	Literature.	3	Music.	3 to 5
	Writing.	2	Drawing.	2
	Composition.	3	Handwork.	3
	Spelling.	5	Nature.	2 to 5
	Arithmetic.	5	Physical Exercise.	5
	Geography.	5		
	Physiology and Hygiene.	2		
	History.	3		
VI.	Literature.	3	Music.	3 to 5
	Writing.	2	Drawing.	2
	Composition.	3	Manual Arts.	
	Spelling.	5	Carpentry.	One long period.
	Arithmetic.	5		C. for boys.
	Geography.	5	Sewing.	S. for girls.
	Physiology and Hygiene.	2	Physical Exercise.	5
	History.	3		

Seventh and Eighth Years.

\+ Three courses—Industrial, Academic, and Commercial—each having a definite purpose in view, and having a backbone, that is, one subject, running through both years.
a At least two well-defined courses.
— The courses are choppy, indefinite and do not lead to anything in particular.

Secondary School.

\+ Five courses—Scientific, Technical or Agricultural, College, Commercial, General—each having a definite purpose in view, and having a backbone, that is, one subject running through several years.
a At least three well-defined courses.
— Less than three courses.

Special Rooms.

\+ One for every 16 regular grade rooms. In large school systems there should be special rooms for defective, slow, non-English speaking and brilliant children.
a A start has been made.
— No special rooms.

Summer Schools.

\+ Adequate number, including supervised playgrounds.
a Limited number for those who are behind in their work.
— Nothing.

EQUIPMENT.

+		a					−		
100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	
										Text-books
										Supplementary Readers
										Maps and Globes
										Blackboards
										Clocks
										Thermometers
										Bells and Telephones
										Flags
										Pictures and Statuary
										Library
										Musical Instruments
										Charts
										General School Supplies
										Kindergarten Devices
										Collections
										Plants
										Apparatus
										Special Equipments

School._____ Date._____ Rating._____
Remarks.

Fig. 1.

GRAPH SHEET.

School._____ Date._____ Scores. S.&H. ___ O.I. ___ B.&P. ___ E.___ C.of S.___

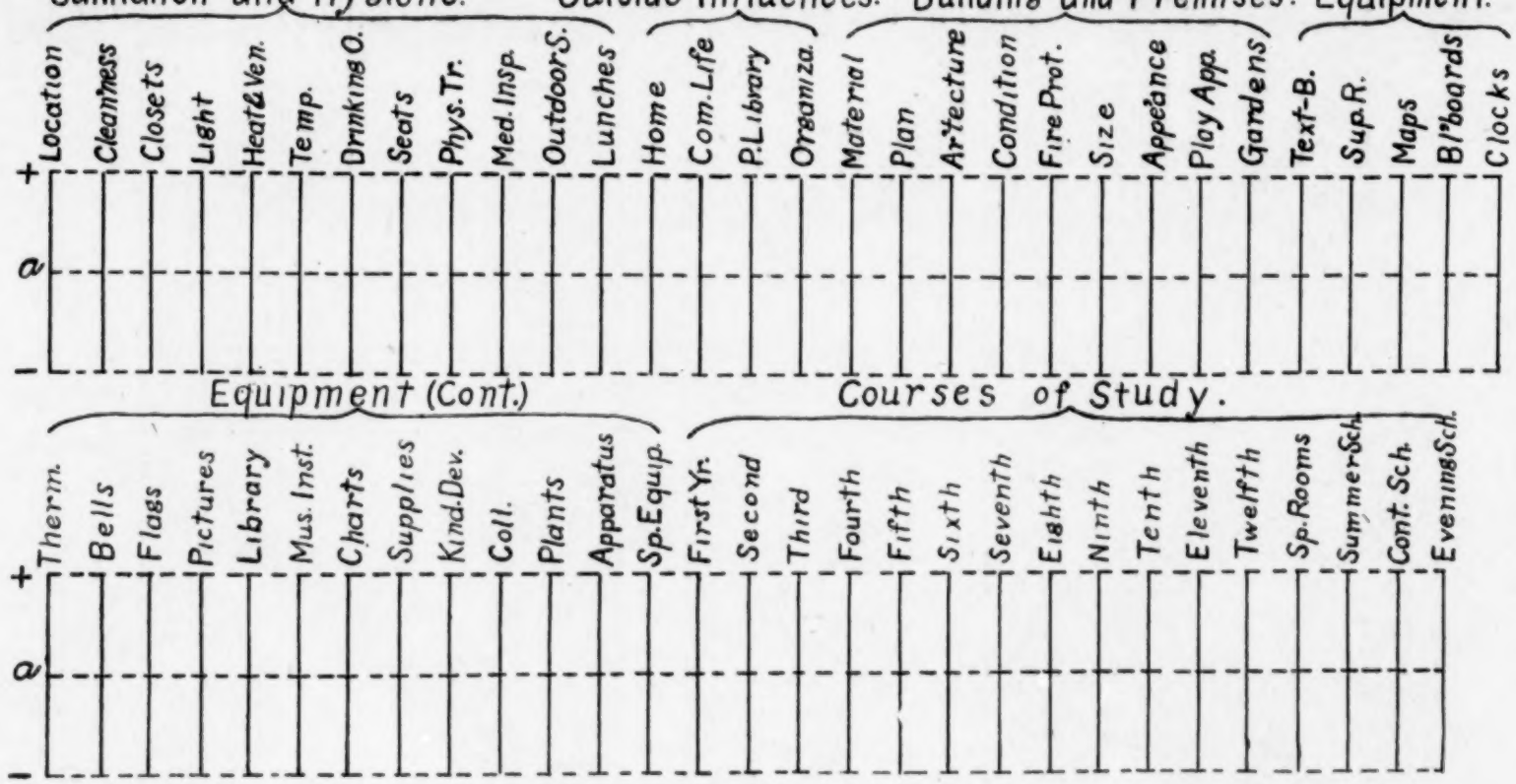
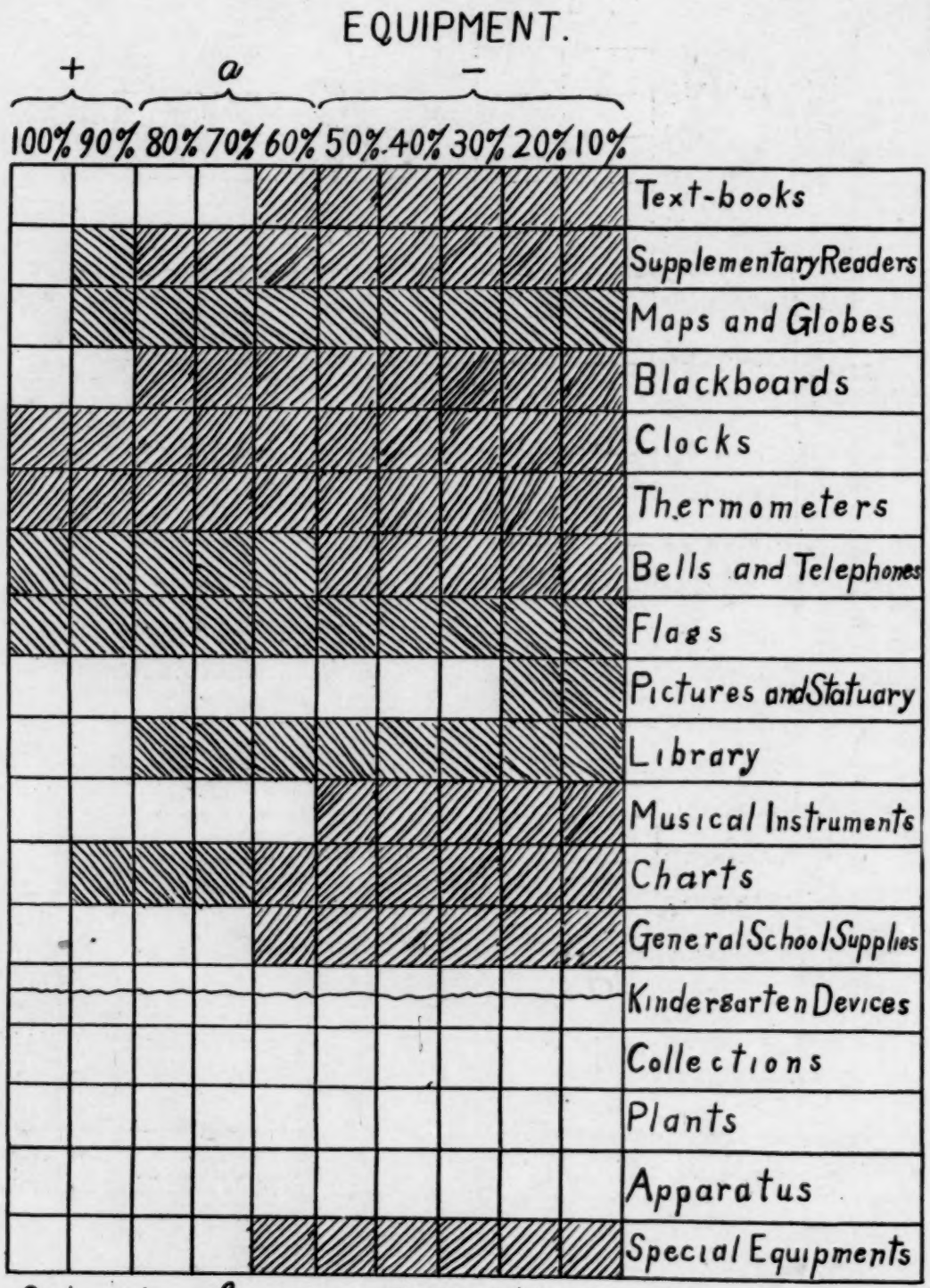


Fig. 2.

EQUIPMENT.


EQUIPMENT.
+
a
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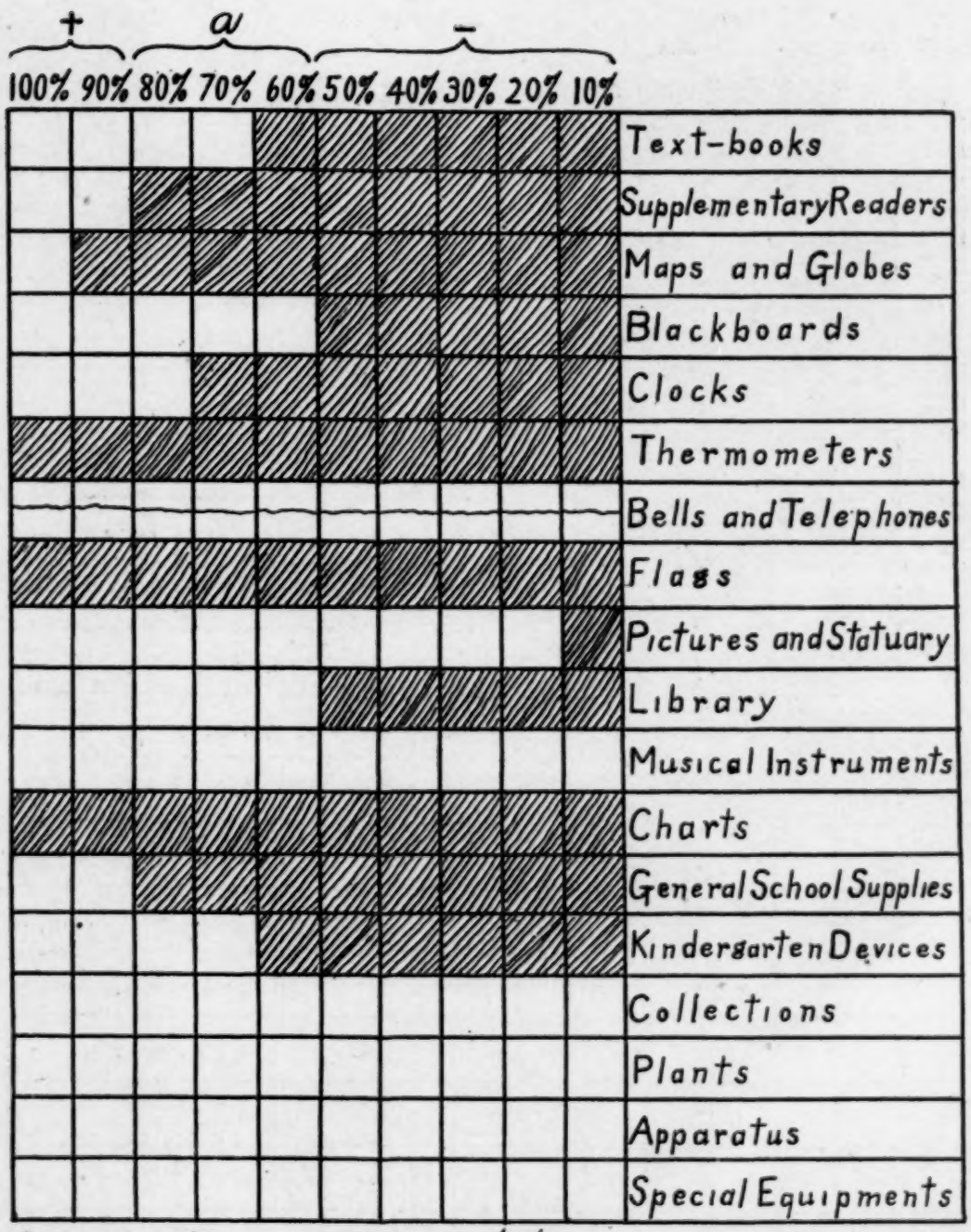
100% 90% 80% 70% 60% 50% 40% 30% 20% 10%
Text-books
Supplementary Readers
Maps and Globes
Blackboards
Clocks
Thermometers
Bells and Telephones
Flags
Pictures and Statuary
Library
Musical Instruments
Charts
General School Supplies
Kindergarten Devices
Collections
Plants
Apparatus
Special Equipments
School. Lo. Date. 12/6/13 2/20/14 Rating. a
Remarks.

Fig. 3.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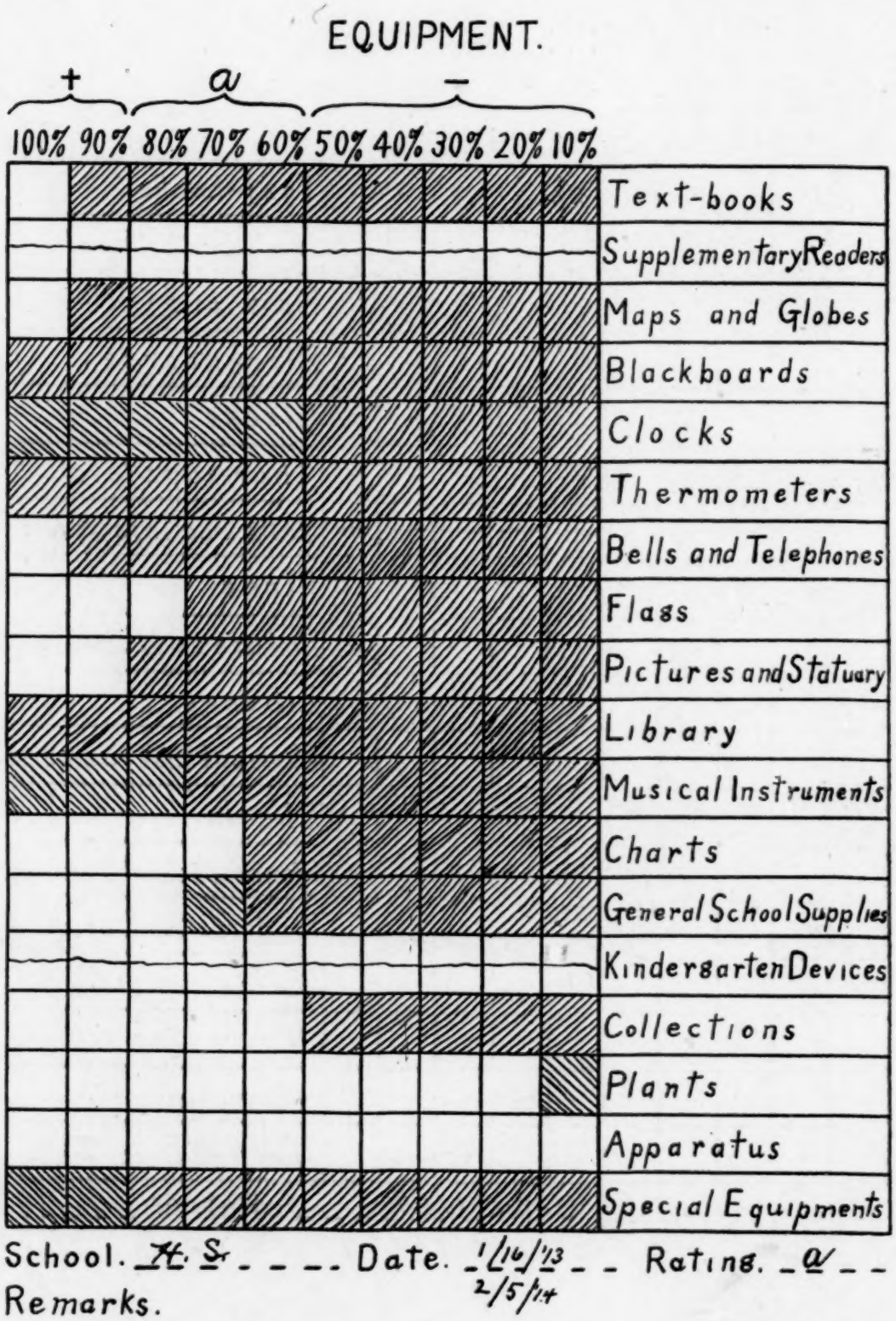
a
−
100% 90% 80% 70% 60% 50% 40% 30% 20% 10%
Text-books
Supplementary Readers
Maps and Globes
Blackboards
Clocks
Thermometers
Bells and Telephones
Flags
Pictures and Statuary
Library
Musical Instruments
Charts
General School Supplies
Kindergarten Devices
Collections
Plants
Apparatus
Special Equipments
School. Marion Date. 1/4/14 Rating.
Remarks.

FIG. 4.


EQUIPMENT.
+
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100% 90% 80% 70% 60% 50% 40% 30% 20% 10%
Text-books
Supplementary Readers
Maps and Globes
Blackboards
Clocks
Thermometers
Bells and Telephones
Flags
Pictures and Statuary
Library
Musical Instruments
Charts
General School Supplies
Kindergarten Devices
Collections
Plants
Apparatus
Special Equipments
School. H. S. Date. 1/16/13 2/5/14 Rating. a
Remarks.

FIG. 5.

GRAPH SHEET.

School. L. Date. 12/6/13. Scores. S.&H. a O.I. a B.&P. a E. – C. of S. a

2/20/14 a.

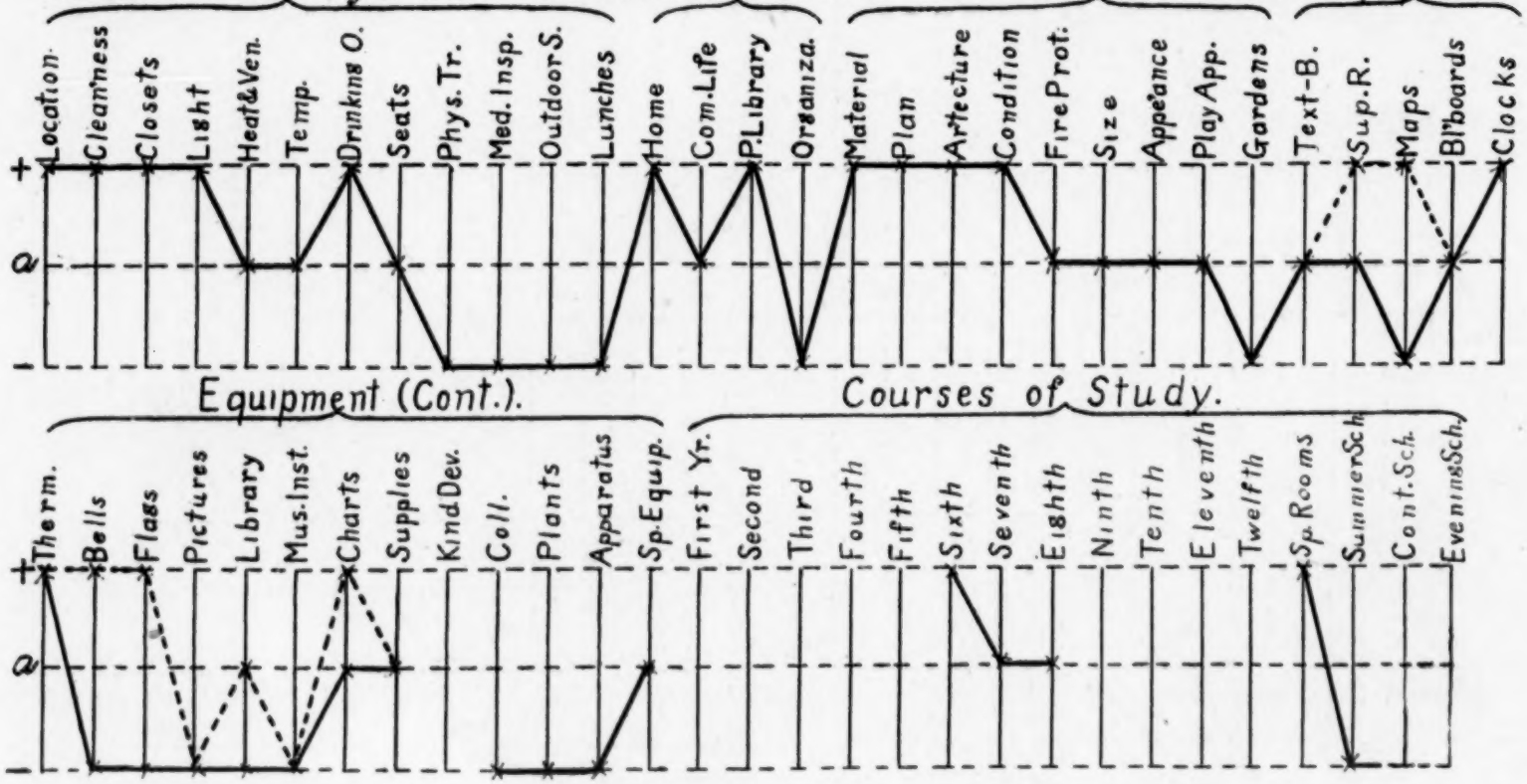


Fig. 6.

GRAPH SHEET.

School ___H. S.___ Date. 2/5/'14 Scores-S. & H. a O. I. a B. & P. a E. a C. of S. —

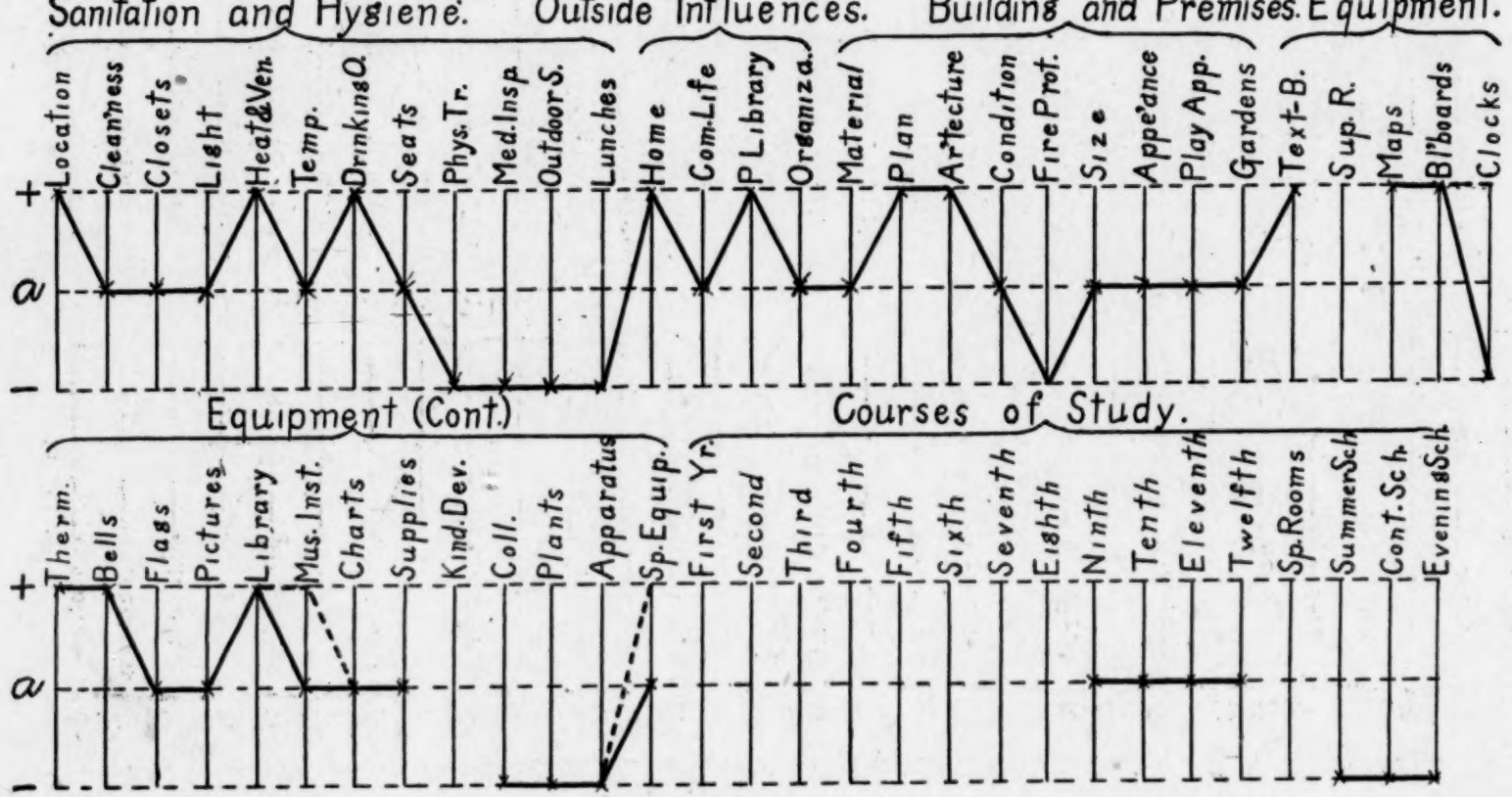


FIG. 7.

Continuation Schools.	+ Part-time schools for pupils from 14 to 18, one-half of time in school. *a* Four hours per week in school. — Nothing.
Evening Schools.	+ Elementary, high and industrial classes. *a* Classes for non-English speaking. — Nothing.

Figures 1 and 2 show graph sheets for equipment, and for the measuring scale as a whole.

The other figures show graphs of measurements which have been obtained by applying this scale to three entirely different kinds of schools.

In figure 3 two different measurements are given of the equipment of a new eight-room, upper grade building. On December 6, 1913, the first measurement was made and the result is shown by the lines running from the lower left-hand corners to the upper right-hand corners of the squares. On February 20, 1914, a second test was made and the lines running in the opposite direction show the increased equipment. Third and fourth tests could be made and recorded on this same sheet by the use of vertical and horizontal lines, respectively. In general practice such tests would probably be made annually, so that one graph sheet would last four years. With a set of such record sheets filed in his office, a superintendent would always have at hand adequate information regarding his whole school system.

Figure 4 shows the graph of a one-room rural school. The irregular horizontal line running through the squares means that this item is not necessary in this kind of a school, and so is not counted. The rating of equipment is found by adding the percentages of the different items together and dividing by the number of items (not counting those which are unnecessary in any particular school). In this case the sum of the percentages is 850. Dividing by 17 gives 50, which is the average per cent. The value of 50 per cent. is —.

Figure 5 shows two measurements of a high school equipment. While the second measurement shows a gain, yet it is not enough to change the rating, which is A in both cases.

The complete graph of school L, whose equipment is shown in figure 3, is given in figure 6. The solid lines show the record of December 6, 1913, and the broken lines show the correction made after the second measurement of the school equipment.

The complete record or graph of the high school is shown in figure 7.

COMPARABLE MEASURES.

TRUMAN LEE KELLEY,

University of Texas.

In the November issue of this JOURNAL Weiss proposes[1] that measurements be expressed as indices, and especially recommends that 50 times the gross measure divided by the mean of all the measures be taken as the record for each individual. Weiss states that measures of different and varied traits, when so expressed, are "directly comparable." A reference to his statement in this regard will show that no limitations or qualifications to this claim are pointed out or intimated. Furthermore, the type of data used to illustrate the direct comparability of such index measures happens to be such that it does not, on the face of it, reveal any shortcomings in the method, though if measures of variability, such as the mean deviation, standard deviation or quartile deviation, were given, the inadequacy of the method would undoubtedly be apparent from his own data.

It happens that Pintner,[2] in the same November issue of this JOURNAL, has used the index method in a study of the reliability of handwriting scales, and as the data that he gives is quite complete, it will be convenient to show by means of it that the method leads to substantial error.

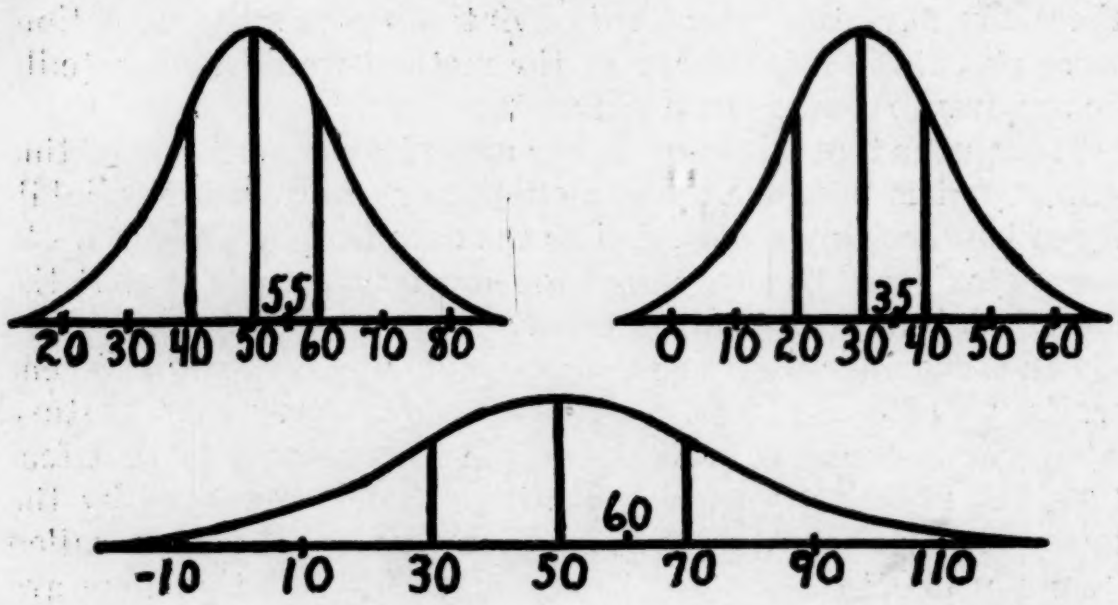
First, consider what are "comparable measures of different traits." Literally, two measures which have any feature whatever in common are comparable with respect to that feature, but practically much more than that is conveyed by the term. In dealing with numerical measures that are called "comparable" the student has a right to expect that they are comparable with respect to magnitude, *e. g.*, if the index meas-

[1] WEISS, A. P., *A Modified Slide Rule and the Index Method in Individual Measurements.*

[2] PINTNER, RUDOLPH, *A Comparison of the Ayres and Thorndike Handwriting Scales.*

ure for one trait is 52 and the index measure for a second is also 52, then it would be justifiable to conclude that the measure of the second trait represented the same degree of superiority above the average as that represented by the first measure. In other words, if the measure 52 lies just within the upper 40 per cent. of all measures of the group, then the second 52 should mean the same with reference to the second trait and group. In general, this is not the case with index measures. It may be said that such measures are comparable with respect to being greater than, or less than, 50. Given two index measures, 52 and 52, it is correct to conclude that each trait lies above the average of its group, but it is not correct to conclude that they both lie the same distance above the average. Farther on an illustration is given showing that the gross measures of three different traits, each lying just within the poorest 1 per cent. of their respective groups, have index measures of 24.4, —3.8 and 42.

Expressing equal distances above the averages in terms of normal distributions would mean that 55, 35 and 60 in the graphs of the accompanying distributions were all equal:



Numerically, the process of securing measures of these three traits, which are equal, is that of subtracting from each measure the average measure for the group and dividing by some

uniform measure of deviation, *i. e.*, $\frac{55\text{-}50}{10}$, $\frac{35\text{-}30}{10}$, $\frac{60\text{-}50}{20}$, where 10, 10 and 20 are measures of quartile deviation for the three groups. This method may be used in the case of all distributions unless markedly skew, in which case it is questionable if any measures can be devised which shall be at all accurately comparable to the measures of normal distributions.

The practice of considering comparable measures of the type, $\frac{\text{gross measure—mean}}{\text{some measure of deviation}}$ is extensively recognized, *e. g.*, in calculating ordinary coefficients of correlation. Under certain special conditions the differences between index measures and 50 would be very nearly proportional to measures of the type just suggested, so that if these special conditions held for two sets of index measures, the measures could be safely compared. Without theoretically determining the particular conditions that must maintain before comparison of index measures is justified, an illustration drawn from actual use will test the reliability of the method.

A reference to Pintner's article at this point will clarify the following treatment. It is desired to compare Pintner's conclusion, that the variation in estimating handwriting by the Ayres scale is much greater than that in estimating it by the Thorndike scale, with the conclusion that is warranted from the same data when variation for each of the scales is measured in units of deviation of the respective scales.

The mean deviations of gradings of samples of handwriting may be obtained from Tables III and I. The first column of Table III gives the sum of the deviations from 50 of the index measures for each sample when judged by the Ayres scale, *i. e.*, the first entry in column one, Table III, equals the summation of $\frac{50\ A_1}{M_{A_1}} - 50$, where A_1 stands for one of the 33 estimates, using the Ayres scale, given to sample one, and M_{A_1} stands for the mean of these 33 grades. M_{A_1} is given in Table I, so that substitution gives the equation

$$276.0 = \Sigma\left|\frac{50\ A_1}{37.1} - 50\right|, \text{ which } = \frac{50 \times 33}{37.1}\Sigma\ \frac{|A_1 - 37.1|}{33}.$$

$$\text{Or, } \frac{\Sigma|A_1 - 37.1|}{33} = \frac{37.1 \times 276.0}{1650}.$$

The left-hand member of this last equation is the mean variation of the A_1 measures, and is the measure sought. An exactly similar calculation will give the mean variation of the gradings on the Thorndike scale. These mean variations for the gradings of each sample are given in the accompanying table. The last column is explained below.

Sample.	Mean variation. Ayres.	Mean variation. Thorndike.	7.9 × mean variation. Thorndike.
1	6.20	.594	4.69
2	8.02	1.150	9.09
3	5.85	1.605	12.67
4	8.15	.744	5.88
5	6.50	.750	5.92
6	4.66	.934	7.37
7	7.84	1.086	8.58
8	5.86	1.091	8.62
9	8.58	1.138	8.99
10	8.90	1.212	9.58
11	9.44	.849	6.71
12	3.08	.900	7.10
13	7.78	1.334	10.54
14	8.14	1.404	11.08
15	5.40	.767	6.06
16	6.72	1.242	9.82
17	7.84	.804	6.35
18	7.81	1.221	9.64
19	9.22	1.366	10.79
20	7.98	1.309	10.34
21	6.71	.817	6.45
22	8.58	1.057	8.35
23	10.10	1.569	12.38
24	8.05	1.440	11.37
	177.41	26.383	208.37
Means	7.40	1.099	8.68

7.40 and 1.099 are the mean variations in terms of their respective scales, but cannot be directly compared with each

other until comparable units of deviation are known. Several ways of equating these units are possible,[3] *e. g.*, since the same samples were graded on the two scales, it may be assumed that the range of grades given on the Ayres scale is equal to the range of grades given on the Thorndike scale. Sample 12 is the poorest on each of the scales, and sample 16 is the best. According to Table I, the range covered on the Ayres scale is 61.5 (82.1—20.6), and the range covered on the Thorndike scale is 8.9 (14.8—5.9). Therefore, 61.5 A = 8.9 T, or T = 6.91 A. A measure of spread that is almost invariably more accurate than the total range is its standard deviation. These deviations have accordingly been calculated, and are, for column one, Table I (Ayres), 15.93, and for column two (Thorndike), 2.917. This gives the relation that each Thorndike unit equals 7.90 as great a distance as an Ayres unit. As this measure is undoubtedly more reliable than the 6.91 obtained above, it is used. In order to compare measures of deviation on the two scales, it is only necessary to divide the gross Ayres measures of deviation by their standard deviation, 15.93, and the Thorndike measures by their standard deviation, 2.917, or, what amounts to the same thing, let the Ayres measures stand as found and multiply the Thorndike measures by 7.90. This has been done, and the result is shown in the last column of the above table. Each variation shown in this column, for each sample, may be compared directly with the variation for the same sample shown in the Ayres column. The average variation of the estimates upon the Ayres scale is 7.40, and upon the Thorndike scale, when reduced to comparable units, 8.68, which gives a difference of 1.28 in favor of the Ayres scale. The probable error of this difference, calculated by the ordinary formula, is .372, which, on its face value, would undoubtedly indicate that there is a slight superiority in the uniform-

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[3] STARCH, *J. Ed. Psych.*, V, No. 4, pp. 445-64, uses a method to equate the units of each of the scales to the units of a percentile scale, which, in the notation here used, would give $\frac{A}{.85} = \frac{T}{8.2}$ in the case of judgments of business men and $\frac{A}{.79} = \frac{T}{7.25}$ in the case of judgments of teachers. This gives, on an average, 9.41 × A = T. This constant, 9.41, may be compared with the constant 7.9, here obtained from Pintner's data. The writer feels that 7.9 is the more accurate constant.

ity of estimate when using the Ayres scale. However, .372 is not a reliable measure of the probable error of the difference, for the probable error of the constant 7.90 enters in indirectly, and it only seems safe to conclude that there is fair evidence to believe that the uniformity of estimate of handwriting by means of the Ayres scale is slightly greater than that by means of the Thorndike scale.

This conclusion is diametrically opposed to that drawn by Pintner, and is offered as an illustration of the serious error the index method may lead to. As a further illustration, the following three gross scores, taken from the writer's own data,[4] are expressed in terms of index measures, and again as deviations from the means divided by the respective standard deviations.

	I. Gross score.	II. Gross score lies just within the lowest.	III. Average score for group.	IV. Standard deviation of group.	V. Score as index measure.	VI. Score as measure of deviation ÷ standard deviation.
Alg. test.....	43.4	1%	89	19.58	24.4	—2.33
Hist. test.....	—.46	1%	6	2.77	—3.8	—2.33
Age	12.28	1%	14.6	.996	42.0	—2.33

A reference to column two shows in what vital sense the gross measures are equal. The index measures in column five betray this fact in no wise, but the measures in column six show this equality.

The constant 7.90 has been used to equate deviations on the two scales, and for the convenience of other workers with the scales the following table, derived with the help of this constant, gives the value of each measure of the one scale in terms of the other, though it has no bearing upon the main thesis just concluded. The argument up to this point has not demanded that the scales measure the same thing. It would be a sheer assumption to state that the scales measure identical qualities, but as Pintner finds a correlation between the average gradings upon the two scales of .98, there is empirical justification for such equating as given in the following table:

[4] KELLEY, T. L., *Educational Guidance.* 1914. Appendix.

Equal Measures.	
Ayres scale.	Thorndike scale.
9.5	5
17.4	6
20	6.33
25.3	7
30	7.60
33.2	8
40	8.86
41.1	9
49.0	10
50	10.13

Equal Measures.	
Ayres scale.	Thorndike scale.
56.9	11
60	11.39
64.8	12
70	12.66
72.7	13
80	13.93
80.6	14
88.5	15
90	15.19
96.4	16

In closing, the writer would like to recommend that the following measures, which are entirely "comparable" with measures of the same type for all traits, provided they are not decidedly skew in their distribution, be more extensively used, and be designated by the letters s, m and q, and be known as standard measures,[5] mean measures and quartile measures, respectively:

$$s = \frac{\text{gross measure} - \text{mean}}{\text{standard deviation}}$$

$$m = \frac{\text{gross measure} - \text{mean}}{\text{mean deviation}}$$

$$q = \frac{\text{gross measure} - \text{mean}}{\text{quartile deviation}}$$

Besides the fact of comparability, the use of these measures would simplify the understanding of many formulae, *e. g.*, the Pearson coefficient of correlation between two series of measures is simply the average product of their standard measures; the Thorndike coefficient of correlation based upon ratios is simply the median quotient of the pairs of standard measures, or of the mean or quartile measures.

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[5]The recommendation here is the same as that of R. S. Woodworth, combining the results of several tests. Psychological Review, volume XIX, page 97. The Standard Measures here proposed are the same as Woodworth's reduced measures.

COMMUNICATIONS AND DISCUSSIONS.

REPETITION *VERSUS* RECALL IN MEMORIZING VOCABULARIES.

Twenty-eight adult students learned four vocabularies of twenty pairs each, the second by attentive reading and re-reading, the first by reading, then covering the second members of the pairs and recalling each of them upon seeing the first member, so far as possible, re-reading only as necessary. The third vocabulary was learned in the same manner as the second, and the fourth in the same manner as the first. The first members of the pairs were unknown German words in I and II, two-syllable nonsense words in III and IV. The second members were in all cases English words. In testing, the order of the pairs was changed. The score kept was (1) the time required for the learner to (as he thought) learn the vocabulary, and (2) the number of equivalents given correctly in the test. The test was made immediately after the learning.

There was no demonstrable superiority in the method involving recall from within so far as possible. Indeed, the results, at their face value, slightly favored the mere reading and re-reading. This, however, was partly due to the over-learning of the first vocabulary, there being a tendency to take profitable risks in the vocabularies after the first.

The experiment was too crude and too slight to give numerical results worth presenting in detail. For the eleven individuals whose records in the first vocabulary were 17 correct or less, the mere reading and re-reading required 3 per cent. less time and produced 14 per cent. more words correct, the scores for the individuals separately being as shown in Table I.

THE EFFECT OF CONTINUOUS EXERCISE AND OF REST UPON DIFFICULT MENTAL MULTIPLICATION.

In 1911 (JOURNAL OF EDUCATIONAL PSYCHOLOGY, Vol. 2, pp. 61-80) the author reported the results of continuous work of from three and a half to twelve hours and of a night's rest upon the efficiency of adult students in the very hard task of multiplying mentally a three-place by a three-place number. It appeared there that the exercises resulted in improvement in spite of its continuity, and that the rest resulted in a further improvement, but of moderate amount.

I report at the present time the results for a somewhat similar experiment, but with a work period of only about two hours and with *two retests*, one after a rest of 30 minutes, and another after a full night's sleep. The subjects of this experiment were seventy-two undergraduate students who did the work without supervision, being given only the directions printed below.

TABLE I.

The Time Spent in Learning and the Number of Correct Equivalents (out of 20) for 11 Adults in a Test in Learning Vocabularies. I, II, III, IV Represent the Order of Time.

	I. Studied by Recall.		II. Studied by Repetition.		III. Studied by Repetition.		IV. Studied by Recall.	
Individual.	Time in min.	No. correct.	Time in min.	No. correct.	Time in min.	No. correct.	Time in min.	No. correct.
A	11	13	8	14	10	9	6	7
B	12	15	12	20	12	19	12	18
C	20	16	10	20	10	20	8	19
D	15	17	14	19	16	14	23.5	17
E	18	12	17	20	17	17	14	16
F	14.7	11	15.5	14	16.2	13	12.3	14
G	9	5	7	11	3.5	15	4	14
H	19.8	17	14	18	15	17	17	12
I	25	17	21	18	25	20	25	15
J	45	14	40	12	25	9	25	10
K	15	16	19	20	23.5	20	14.5	19
Average	18.6	13.9	16.1	16.9	15.8	15.7	14.7	14.6

It would seem desirable to repeat such experiments in view of the conflict between the results obtained here and the deduction which psychologists and students of education have made from the law of "forward conduction."

EDWARD L. THORNDIKE.

Teachers' College, Columbia University.

Do experiment 36 at home and record the results. Follow the directions absolutely.

EXPERIMENT 36.

Arrange to be undisturbed through a morning or an afternoon or evening. Provide yourself with a watch that records seconds. Multiply mentally, using the examples printed on this page, writing absolutely nothing until you have an entire answer to an example. Then write it and proceed at once to the next. Record the time at which you begin, and record the time at which you finish each row. Do not stop at all except to record these times until you have finished all the examples or worked at least two hours. Then proceed as directed on page 107. Do absolutely the best work you can throughout.

	653	537	927	847	286	728
A.	926	453	384	265	757	487

Here follow 8 similar rows.

After finishing examples above or working for two hours, rest for half an hour and then do row J on this page, recording the time of beginning and the time of ending.

On the following day in the morning after you have had breakfast and a half hour's rest, do row K on this page, recording the time of beginning and the time of ending as before.

You will, of course, do these mentally, without writing anything till the whole answer is obtained.

	428	495	467	256	297	279
J.	369	743	853	368	832	687
	853	486	294	372	287	837
K.	294	954	623	736	924	568

Fill out the record-blank below. A key of the answers will be found on page ....

As in the earlier experiment, the product produced per unit of time improved in amount and quality during the work period. I have divided the seventy-two subjects into four groups according to their initial ability in the test. The first group averaging .61 of an example per minute in the first row did .68 examples per minute in the last row of the work period. The percentage of right figures in the answers rose from .86 to .87. The second group rose from .36 examples per minute with 80% right figures to .38 examples with 83% of right figures. Similar facts are given in Table I for the other groups.

The rest of 30 minutes improves the scores further and the rest of a night improves them still further. The improvement which follows upon them, and which is the most useful measure of fatigue, or the

temporary deterioration preventable or curable by rest, is, however, small. The facts are given in Table I. We may summarize them very roughly as follows: The rest of 30 minutes increased the product produced per unit of time by about 5%; the rest of a night increased the product by about 7% more. The accuracy of the work remained almost exactly the same.

TABLE I.

The Effect of Continuous Exercise of from 100 *to* 140 *Minutes, of a Rest of* 30 *Minutes, and of a Full Night's Rest, Upon the Quantity and Quality of Mental Multiplication with Three-Place Numbers, in the Case of* 72 *Individuals.*

	1		2		3		4	
	Average score for first row of six examples.		Average score for last row of six examples done.		Average score for row done after 30 minutes' rest.		Average score for row done after night's rest.	
	Amount per minute.	Percentage of correct figures in answers.	Amount per minute.	Percentage of correct figures in answers.	Amount per minute.	Percentage of correct figures in answers.	Amount per minute.	Percentage of correct figures in answers.
Group I (n = 18)...	.61	.86	.68	.87	.80	.88	.80	.90
Group II (n = 18)...	.36	.80	.38	.83	.41	.81	.44	.82
Group III (n = 18)...	.24	.80	.35	.85	.33	.85	.39	.84
Group IV and III combined.....	.30	.80	.365	.84	.365	.83	.41	.83
Group IV (n = 18)...	.143	.76	.168	.78	.182	.78	.191	.81

EDWARD L. THORNDIKE.

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ABSTRACTS AND REVIEWS.

MORTON PRINCE. *The Unconscious: the Fundamentals of Human Personality, Normal and Abnormal.* New York: The Macmillan Company, 1914. Pp. xvi, 549. $2.00 net.

This considerable volume (larger than at first glance it appears because printed on thin paper) has in it psychologic material which it should be the immediate task of specialists in educational psychology to adopt and to apply to pedagogy; for although primarily directed to specialist-physicians, it makes contributions to the mental mechanism which must rapidly become incorporated with every phase of applied psychology as well as of "academic" doctrine. The time is past (as my little censure at the New Haven meeting showed) when mention of the subconscious makes the "academic psychologist" shy like a filly at sight of a steam road roller.

The present volume consists of selected lectures (with the exception of four) from courses on abnormal psychology delivered to the seniors of the Tufts Medical School (1908-'10) and later at the University of California. "They were, I believe," says Professor Prince in the preface, "the first to be given on these subjects in any medical school or college in this country," (and, it may be not improper to add, the normal halves of the courses were given by the present reviewer as a continuation of lecture courses in Normal Medical Psychology begun six or seven years before).

The chapter-headings indicate better than could be otherwise briefly suggested the scope and the substance of the book: "Theory of memory as a process; Conservation of forgotten experiences of normal, artificial, and pathological life; Conservation a residuum of experiences; Neurograms; Subconscious processes; Subconscious intelligence; Unconscious; Organization of unconscious complexes; Meaning of ideas as determined by settings; Meaning, settings, and the fringe of consciousness; Settings of ideas as subconscious processes in obsessions; Two types of phobia; Physiological manifestations of emotion; Instincts, sentiments, and conflicts; General phe-

nomena resulting from emotional conflicts; and Summary and general conclusions." Without a deep-seated comprehension of these mental prosesses, and such as these, no teacher has adequate acquaintance with his students' behavior, instincts, interests, and other aptitudes to the acquirement of knowledge and of understanding.

A page and a half of the summary and general conclusions has "meat" enough in it for teachers' consumption to require its present quotation: "Viewing as a whole the phenomena we have studied, we see why it is that personality is a complex affair in that in its make-up there enter many factors, some acquired and some innate. Each of these is capable of more or less autonomy, and upon their harmonious cöoperation depends the successful adaptation of the personality to its environment. It is, we may say with almost literal truth, when these factors work to cross purposes, that a personality ceases to be a harmonious whole; just as the individuals composing a group of persons, a football team, for example, when they fail to work together and each strives to fulfill his own purposes, ceases to be a single team. Consciousness is not a unity in any sense that the term has any significant meaning beyond that which is a most banal platitude. The unity of consciousness [do not read personality] seems to be a cant expression uttered by some unsophisticated ancient philosopher and repeated like an article of faith by each successive generation without stopping to think of its meaning or test it by reference to facts. Neither a reference to the evidence of consciousness or to its manifestations gives support to the notion of unity. The mind is rather an aggregation of potential or functioning activities, some of which may combine into associative functioning processes at one time and some at another; while again these different activities may become disaggregated with resulting contraction of personality, on the one hand, and conflicting multiple activities on the other.

The unconscious, representing as it does all the past experiences of life that have been conserved, is not limited to any particular type of experiences; nor are the subconscious and conscious processes to which it gives rise more likely to be determined by any particular antecedents, such as those of childhood, [*sic*] as some would have us believe. Nor are these motivated by any particular class of emotional instincts or strivings of human personality. The instincts

and other innate dispositions which are fundamental factors are, as we have seen, multiform, and any one of them may provide the motivating force which activates subconscious as well as conscious processes. Impelled by any one or combination of these instincts, unconscious complexes may undergo subconscious incubation, and in the striving to find expression may work for harmony or, by conflict with other complexes, for discord.

The science of education subconsciously awaits the direct practical application of such important considerations as these to the art of ideal teaching, for sufficient scientific material is rapidly accumulating. Morton Prince certainly joins von Hartmann, Charcot, Janet and Freud in the unearthing and "restoration" of this highly significant psychological material.

GEORGE V. N. DEARBORN.

Cambridge.

J. E. WALLACE WALLIN. *Experimental Studies of Mental Defectives. A Critique of the Binet-Simon Tests and a Contribution to the Psychology of Epilepsy.* Educational Psychology Monographs, No. 7. Baltimore: Warwick and York, Inc., 1912. Pp. vi, 155. $1.25.

This book is a critical study of the 1908 form of the Binet-Simon scale of intelligence as an instrument for diagnosing mental defect, and particularly as a device for determining the mental status of epileptics. In Chapter I, by way of introduction, the author points out that we now have fairly accurate norms for the various phases of physical growth, but that scarcely a beginning has been made in the more important field of age norms for the development of different mental traits and capacities. The latter are greatly needed by both alienists and educators, and one of the chief merits of the Binet scale is that it furnishes us with such a set of norms. The chapter sets forth the results of the application of the scale to 333 patients of the New Jersey State Village for Epileptics at Skillman, seventy per cent. of whom were over twenty-one years of age, and compares the findings with the results of testing 378 feeble-minded children at Vineland. The mental age of the epileptics is in general considerably higher than that of the feeble-minded, partly on account of their higher chronological age, partly on account of certain selective factors that determine the class of patients admitted to the institu-

tion, and partly perhaps on account of a higher coefficient of native intelligence in epileptics.

Chapter II presents a detailed analysis of the results, with a critical evaluation of each of the tests on the basis of the cases studied. The author points out that the method of grading recommended by Binet (that of taking the highest age passed as the basal age and adding one year for every five additional tests passed) is apt to give an unduly high mental age with epileptics, owing to the fact that the subjects fail on many of the tests below the basal age. The difference between this method of grading and that which takes as the basal age the highest at which these tests and those of *all ages below* are passed is sometimes as much as two or three years. A comparison of the percentage of failures on different tests of the same age shows that there is a wide variation in the difficulty of the tests for a given age, and that the assumption that these tests constitute equal units is not justified. On the basis of these percentages the author indicates the tests that are too difficult or too easy for their ages and recommends their transposition. In many cases these findings agree with the results obtained by Goddard, Bobertag, and Terman and Childs, and some of the suggested rearrangements are found in Binet's 1911 revision. In many respects, however, the author finds the 1908 series superior to the 1911 revision.

In chapter III the author makes an intensive study of six tests with reference to the age classification of the Binet scale. The tests are rate of naming the four colors, number of words uttered in three minutes, rate of reading and amount of reproduction of a passage, the form board test, the hand dynamometer test, and the ataxiagraph test. This chapter is particularly valuable and points the way to much needed work with normal children. Chapter IV contains a practical guide for the administration of the individual tests. The monograph is an important contribution not only to our knowledge of epileptics, but to the reliability and the significance of the Binet scale.

J. C. B.

THE
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INCLUDING EXPERIMENTAL PEDAGOGY, CHILD PHYSIOLOGY AND HYGIENE, AND EDUCATIONAL STATISTICS

Edited by

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EDITORIAL.

MENTAL TESTS AND CRIMINAL OFFENDERS

Through the courtesy of Mr. Samuel C. Kohs, Psychologist at the House of Correction, Chicago, we are in receipt of an interesting document prepared by Mr. John L. Whitman, Superintendent of the same institution. Mr. Whitman has had long practical experience with the conditions and needs of penal and corrective institutions, so that it is pleasing to find in him an advocate of a system of medical, psychological and sociological investigation to be incorporated in the "houses of detention" which he would substitute for our present antiquated jails, lockups and police stations. Our jail system has done nothing to assist in the solution of the problem as to the cause of crime, though the veriest layman would understand the necessity for some solution of this problem if intelligent treatment of the criminal is ever to be secured. With a system of such "houses of detention" as Mr. Whitman advocates, it would be possible for offenders to be committed for treatment and examination, just as we now commit the sick to hospitals or the mentally irresponsible to commissions in lunacy. We understand that the House of Correction in Chicago has maintained for more than three years a well-equipped hospital for the

medical care of its inmates and that it has recently opened a psychopathic laboratory for the purpose both of mental diagnosis and treatment, supplemented also by an examination of the offender's personal and social history, and aimed to assist both him and the officials who deal with his case to make the sanest possible disposition of his future career as a citizen. In our opinion it would be premature just now to estimate the value of mental tests when applied to this problem. That the insane and the mentally subnormal can usually be detected would doubtless be admitted by most experts: for more precise mental diagnosis of the kind that would seem requisite for fitting the individual to a vocation we fear that time will be lacking in the usual institutional laboratory. Psychologists are not in full agreement as to what tests are best fitted for detailed mental diagnosis, nor have we as yet the needed standards of performance for many of the tests that are generally conceded to be desirable. Fortunately, there is a possibility, in the case of criminal offenders, of inaugurating a "follow-up" system by means of which the hypotheses and tentative conclusions of the penal psychologist may be checked by direct observation of the subsequent careers of those whom they have examined. G. M. W.

THE BIOLOGICAL POINT OF VIEW

In the second part of his presidential address before the British Association for the Advancement of Science at Melbourne, Australia, printed in *Science,* September 4, Professor William Bateson emphasizes the importance of recent studies in heredity for a proper understanding and solution of some of the most important problems of modern life. Speaking of the social menace in the disproportionately rapid increase of mental defectives, he expresses the conviction that at some future day biological thinking will dominate society, and that in that day the shackles of tradition will be thrown off, and that men will grapple with and stamp out this blight on intelligence as they are now grappling with and endeavoring to stamp out typhus fever and tuberculosis. That the domination of biological thinking may come soon must be the hope of every serious student of human life, but before its influence is at all general we believe that there must be a decided shift of emphasis to the biological point of view in our elementary and secondary education. J. C. B.

NOTES AND NEWS.

In response to the rapid multiplication of the technical aspects of school administration and to the need which school superintendents feel for an organ to keep them in touch with current developments in their field, it is proposed to establish a new periodical entitled *Educational Administration and Supervision.* The new journal will cover fields which can be roughly distinguished as follows: 1. State and county systems of education, including rural education and educational legislation. 2. City school systems, dealing with problems of city administration, supervision, management, reporting and educational statistics. 3. Secondary education, including problems of organization, administration, inspection, curriculum making, internal supervision, management, and the pedagogy of the different subjects, with a consideration of those problems of higher education involving the interests of secondary education. 4. Elementary education, with the problems in this field analogous to those cited for secondary education. In addition to these fairly distinct administrative fields the journal will consider the overlapping problems of vocational education, school extension, agricultural education, trade, part-time, continuation, and evening schools, school hygiene, the school as a social center, and the school's co-operative agencies.

State school officers who are struggling with the issue of free textbooks, the subsidizing of special schools or departments, the certification of teachers, the basis for the distribution of school moneys, the inspection and standardization of schools, the erection of modern buildings; *city superintendents* who are studying the distribution of subject matter by grades, the time limit of subjects by grades, the preparation of a salary schedule, the means to be used in rating and promoting teachers, the relationship that should exist between a school board and the superintendent, the wider use of the school plant, the grading and promotion systems in vogue; *high school principals* who are attempting to reorganize their schools in the light of shifting social demands, to differentiate, interpret, adjust, and extend their many curriculums, to provide supervised study, and to direct the social activities of the school; *supervisors* who are

interested in improving their teachers in service, and who wish to employ units and scales for measuring educational results; and *rural school superintendents* who are confronted with a multitude of problems, many of which must be solved at long range,—all these will find *Educational Administration and Supervision* devoted to the questions which they are daily confronting.

The journal will appear monthly, except July and August, beginning January, 1915. The annual volume will approximate 600 pages, and the price will be $2.00 per year. It will be edited by Professor Charles Hughes Johnson and Professor Lotus D. Coffman of the University of Illinois, Supt. James H. Van Sickle of Springfield, Mass., and Supt. David Snedden of Massachusetts, with the assistance of a representative corps of collaborators, and will be published by Warwick and York, Inc., Baltimore.

During the summer two series of publications have been started under the auspices of the Division of Education of Harvard University. The *Harvard Studies in Education* are a series of special monographs dealing with problems of fundamental importance in American education. The first volume in this series is by Dr. W. S. Learned, of the Carnegie Foundation for the Advancement of Teaching. During his stay in Germany as exchange teacher under the Carnegie Foundation, Dr. Learned made a study of the special and professional organization of German secondary-school teachers. From this study he has drawn important conclusions for American education. The book is called "The Oberlehrer: A Study of the Social and Professional Evolution of the German Schoolmaster." The second volume of the series, which will probably be issued this winter, is a study in school administration, dealing with the appointment of teachers in American cities.

The Harvard-Newton Bulletins are the result of a coöperative scheme between the Division of Education and the City of Newton. By the terms of this agreement the staff of the Newton schools and the staff of the Division of Education join in conducting educational investigations and experiments. The work has heretofore been under the direction of the Joseph Lee Fellow for Educational Research, but is now to be done by members of the staff of the Division of Education under the Joseph Lee Foundation, which is maintained, as the Fellowship was, by the generous support of Mr. Joseph Lee of

Boston. The striking features of this plan are that a school system becomes a laboratory for the solution of its own problems, and that the investigations are made through the coöperation of University instructors and the teachers in the school system.

The first number of the Harvard-Newton Bulletins, written by Dr. Learned, who was the first Joseph Lee Fellow, is called "The School System as an Educational Laboratory." It expounds the theory of the coöperative scheme for investigation, and gives an account of the first year's work and plans for the future. The second Bulletin is by Dr. F. W. Ballou, Director of Promotion and Educational Measurement in Boston, who was the Joseph Lee Fellow for 1913-14. This Bulletin contains scales for the measurement of English compositions by pupils of the upper grammar grades and lower high school grades. There are four scales, one each in narration, description, exposition, and argument. The way in which the scales were constructed is explained, and the scales themselves, which consist of six compositions, rated from 45 to 95 per cent. with the merits and defects of each defined, are printed in full. Scales of this kind are intended to assist teachers in their judgment of the excellence of compositions submitted in school, and to help the children to define their own standards of good English. Other investigations will be reported in subsequent Bulletins.

The Detroit public schools, under the superintendency of Charles E. Chadsey, have established a Department of Educational Research, and Mr. Stuart A. Courtis, well known for his work with standard tests in arithmetic and English, has been appointed supervisor. The aims of the department are to measure the efficiency of teaching, to increase the number of children benefiting by school work, to eliminate waste in subject matter and methods, to aid in the adjustment of school training to the world's needs, to help teachers give greater assistance to individual children, to set up objective standards so that each child may have the pleasure of success, to aid in the preparation of reports, to aid in the continued professional training of teachers, and to supply information about the Detroit system.

The School Board of Oakland, California, has recently established a Bureau of Information, Statistics and Educational Research, with Wilford E. Talbert as Director, and has been issuing a series of inter-

esting typewritten bulletins. Bulletin No. 2 outlines the functions of the bureau, which fall under three divisions: 1. The conduct of research studies suggested by experience or ordered by the Board of Education or the superintendents. 2. The encouragement and direction of research among the teachers and principals. 3. "The protection of the schools against unnecessary interruption by research students whose problems are unimportant or whose training is inadequate, and the assistance of properly qualified students who wish to investigate important problems in the schools." In accordance with the last provision arrangements have been made with the University of California and Stanford University for the conduct of research work by advanced students. Bulletin No. 3 contains some suggested problems for investigation, and presents an analysis of the whole field of education from the point of view of research. Over one hundred problems are mentioned. In Bulletin No. 7 announcement is made of a research course in educational psychology for principals and teachers by Mrs. Vinnie C. Hicks of the Oakland schools, under the auspices of the extension department of the University of California.

By agreement with the Boston School Committee, students who secure the Master's degree in the Division of Education of Harvard University on a curriculum including specified courses in Education and allied subjects, may receive the certificate to teach in Boston high schools after a single year of experience elsewhere. This does not exempt such candidates from the regular examination for certification in Boston, but cuts down the requirement of experience from three years to one. This agreement marks a notable advance for the cause of technical training for New England teachers.

C. E. Stromquist of the University of Wyoming is devising standard tests in high-school algebra and plane geometry, analogous to the well-known Courtis Standard Tests in Arithmetic. A preliminary report upon these tests was made at a conference of high-school superintendents and principals of Wyoming held last summer, and a further report upon a revision of the tests was made at the State Teachers' Association in November. We understand that instruction sheets and blank forms for conducting these tests are, or soon will be, furnished to schools that apply for them to Mr. Stromquist

at Laramie, Wyo. The same problem is being attacked by W. S. Monroe, of the State Normal School, Emporia, Kansas, for use in the Leavenworth Survey.

The recent enactment of Congress as a result of the report of the President's Commission on National Aid to Vocational Education promises to give a tremendous impetus to agricultural and industrial education in this country. The bill provides for the establishment of a Federal Board for Vocational Education, and grants large sums to the states for the training of teachers in vocational subjects, provided state legislatures appropriate similar amounts. It is probably the most significant and far-reaching educational legislation by the federal government since the passage of the Morrill Act.

The relation of motherhood to the work of teaching has recently been brought to the fore by the legal battle in New York City. Mr. Isidore M. Levy, of the New York Board of Education, goes on record as opposed to considering marriage a bar to teaching, and favors the granting of long leaves of absence for child bearing, with reinstatement on the examination of the school physician. The only consideration is the efficiency of the schools. If the teacher at any time fails to carry on her work satisfactorily she should be relieved of that work either temporarily or permanently. The dismissal of Mrs. Peixotto was due not to the fact that she became a mother, but that she was absent from her work for three months without even asking for leave.

The number of students enrolled in the Division of Education, Harvard University, at the beginning of the present acadamic year is over 40 per cent larger than the number enrolled at the same period last year. Every course is larger than it was last year. The most gratifying part of the increase is in the number of candidates for the Master's degree. Many students of smaller colleges both in New England and the west are coming to Harvard for a year of technical training before entering secondary school work. There are now twenty-five candidates for the Master's degree in the Department, as compared with nine last year.

The twenty-third annual meeting of the American Psychological

Association will be held in affiliation with the American Association for the Advancement of Science, the American Society of Naturalists, and the Southern Society for Philosophy and Psychology at the University of Pennsylvania, Philadelphia, December 29-31, 1914.

The Ohio State Board of Administration has established a psychological bureau to study and care for juvenile delinquents. In addition to the chief of the bureau, whose salary is $3500 a year, a staff of eight assistants is planned, including three psychologists, a diagnostician, and a bacteriologist. Dr. Thomas H. Haines, professor of psychology in the Ohio State University, has been appointed chief of the bureau.—*Science.*

James Clarence De Voss, M.A. (Colorado), has been appointed professor of psychology and education in the Kansas State Normal School at Emporia.—*Science.*

At Cornell University, Professor D. Kennedy Fraser is carrying on the work of Professor Whipple (now at Illinois University). Pending the appointment of a successor to Professor DeGarmo, who has retired on a Carnegie pension, the course in the History of Education is conducted by Drs. Wright and Thorne of the philosophy department, while Professor Creighton of that department is conducting a Seminar for the discussion of general educational topics.

At the University of Pennsylvania the following changes have taken place in the department of psychology: Edwin Burket Twitmyer, Ph.D., has been promoted from an assistant professorship to a full professorship, and is to be assistant director of the laboratory of psychology; Francis N. Maxfield, Ph.D., has been made assistant professor; Dr. David Mitchell and Mr. Frank H. Reiter have been appointed instructors. Professor F. M. Urban is in Austria, and is said to be with the Austrian army.—*Journal of Philosophy, Psychology and Scientific Methods.*

The Division of Education of Harvard University has been strengthened by the appointment of Professor Alexander J. Inglis, formerly Professor of Education and Director of the Summer School at Rutgers College. Professor Inglis is a graduate of Wesleyan Uni-

versity and received his Doctor's degree from Columbia University. He is the author of "The Rise of the High School in Massachusetts" and of text books in high-school Latin. Professor Inglis will have full charge of the preparation of Harvard and Radcliffe students for teaching in secondary schools. This preparation will, for the present, include only the two courses which have heretofore been offered—Education 3b, a course in Secondary Education, covering the problems of organization, management, and instruction in secondary schools both public and private; and Education 9, the course in Teaching with practice under supervision in the schools of Cambridge, Arlington, Medford, Somerville, Watertown, Belmont, Newton, and Brookline. The Division of Education now has two full professors and three assistant professors, a staff sufficient for the first time in the history of the Division to cover adequately most of the fields of pedagogical study, without undue burden on any member of the staff.

J. Crosby Chapman, B.A. (Cambridge), D.Sc. (London), Ph.D. (Columbia), has been elected assistant professor of experimental education at Western Reserve University.—*Science.*

A revised and enlarged edition of "The Physiology of Exercise" by George Van Ness Dearborn is announced.

The editor and publishers of the *Zentralblatt für Psychologie und psychologische Pädagogik,* which was established last spring for the rapid dissemination of information concerning investigations in all phases of psychology, announce that the *Zentralblatt* will be issued as usual in spite of the war. The announcement mentions the issue of a double number early in November.

CURRENT PERIODICALS.

BRITISH JOURNAL OF PSYCHOLOGY. Vol. V, Pt. 4, March, 1913. GLADYS W. MARTIN. *A Study of Mental Fatigue.* 427-446. The fatigue exercise consisted of mental multiplication for one hour, and the tests employed before and after the exercise were (1) spatial threshold, (2) muscular capacity, (3) rate of respiration, (4) pulse rate, and (5) speed and accuracy of perception. The author concludes that the signs of fatigue differ according to the individual. "A numerical estimation of the decrease in speed or in accuracy will not invariably represent the extent of fatigue; and the changes in spatial threshold, in rate of respiration, in pulse rate, and in muscular capacity are not sufficiently constant to be regarded as sure signs of fatigue in its early stages."

A. WOHLGEMUTH. *On Memory and the Direction of Associations.* 447-465. Experiments with series of colors and diagrams tend to discredit the so-called "law of forward conduction," according to which succeeding members are more readily recalled than preceding members. This "law" was derived from experiments with nonsense syllables and words, and its application would seem to be limited to that material.

Vol. VI, Pt. 1, June, 1913. STANLEY WYATT. *The Quantitative Investigation of Higher Mental Processes.* 109-133. "The primary aim of this investigation has been to ascertain to what extent different tests correlate with a subjective estimate of intelligence, and to select those tests which give the highest coefficients of correlation." Seventy-five children from ten to thirteen years of age were tested with fifteen tests. The tests included cancellation, word-building, sentence construction, analogies, completion, missing digits, part-wholes, dissected pictures, rearranged letters, immediate and delayed memory, cross-line test, and interpretation of fables. The analogies and completion tests give the highest correlations with the subjective estimations of intelligence.

Pt. 2, October, 1913. C. W. VALENTINE. *The Aesthetic Appreciation of Musical Intervals Among School Children and Adults.* 190-216. Experiments were made with 146 adults and 271 children from six to fourteen years of age. Adults prefer the major third as the most pleasing interval. After this come in order the minor third, the octave, and the major and minor sixth. No appreciable preference for concords before discords is shown by children under nine. Above this age their preferences are in practical agreement with those of adults.

WILLIAM BROWN. *The Effects of "Observational Errors" and Other Factors Upon Correlation Coefficients in Psychology.* 223-235. A criticism of Spearman's "accidental" and "regular" deviations, and his formula for eliminating the effects of the latter in correlations. The author recommends that a large number of measures be made at fixed intervals throughout an extended period of observation.

Pts. 3 and 4, February, 1914. FRANK SMITH. *An Experimental Investigation of Perception.* 321-362. Can we classify individuals according to their type of perception, and do adults and children show any fundamental differences in their manner of perceiving? Thirty-two adults and thirty-eight school children were tested with fourteen stereopticon pictures exposed for from one-thirteenth to one-fifth of a second. The exposures were repeated as often as necessary for a fairly complete comprehension of the picture, and the number varied from five to one hundred. An extremely interesting study, of great importance for an understanding of the development of perception.

G. W. VALENTINE. *The Color Perception and Color Preferences of An Infant During Its Fourth and Eighth Months.* 363-386. The method used at four months was that of the direction and maintenance of vision, while at eight months grasping was the method employed. The results agreed in the main, and showed the order of preference to be (1) yellow, (2) white and pink, (3) red, (4) brown and black, (5) blue and green, and (6) violet.

T. H. PEAR AND STANLEY WYATT. *The Testimony of Normal and Mentally Defective Children.* 387-419. A very interesting study along the line of Stern's psychology of testimony. The test was a combined "event" and "picture" test. Two visitors, a man and a woman, entered the school room, and the man took a number of articles from his bag and showed them to the teacher and the class. One of these was a large lithograph with striking figures on it. The next day the children were asked to write a complete account of what went on. Immediately after the free account the children were put through a definite "interrogatory." Two groups of normal children and four of defective were tested. The authors find that the spontaneous narrative of normal children is quite reliable, while the defectives exhibit varying degrees of unreliability.

Vol. VII, Pt. 2, September, 1914. W. H. WINCH. *Some New Reasoning Tests Suitable for the Mental Examination of School Children.* 190-225. Six sets of reasoning exercises of five questions each were devised and tried on a group of forty-one boys between the ages of eleven and twelve from Standard III to Standard VII. Sample answers are given and analyzed, and on the basis of these a scheme of scoring is worked out. The answers are then arranged in the order of their maturity, and furnish interesting material for a discussion of the development of reasoning.

M. JANE REANEY. *The Correlation Between General Intelligence and Play Ability As Shown in Organized Group Games.* 226-252. The games considered were football, hockey and cricket for boys, hockey and netball (basket ball) for girls. General intelligence was determined by (a) opinions of teachers, (b) school marks, and (c) psychological tests. The latter were six in number, three cancellation tests, two dot-ringing tests and a spot pattern test. The subjects included 600 children from eight to eighteen years of age. A general average correlation of $r = .32$ was found between intelligence and play ability. Social position, involving "the tradition of group games," had little effect on the results. Sex likewise made little difference. The estimate of the teacher, if obtained by amalgamating several independent opinions, was found to be very reliable.

NELLIE L. PERKINS. *The Value of Distributed Repetitions in Rote Learning.* 253-261. "Less is recalled when the readings are given every day than when a certain interval, varying from one to three days, is allowed to elapse between the readings."

Pt. 3, October, 1914. AGNES L. ROGERS AND J. L. MCINTIRE. *The Measurement of Intelligence in Children by the Binet-Simon Scale.* 265-299. The article includes a critical consideration of the employment of the scale by Bobertag, Goddard, Terman and Childs and others, and a detailed account of the examination of 217 Scotch children. The distribution of Scotch children about the "at age" point agrees more closely with that of American children (Goddard, Terman and Childs) than with that of German (Bobertag) or French (Binet) children. The authors make several interesting suggestions for standardizing the individual tests.

STANLEY H. WATKINS. *Immediate Memory and Its Evaluation.* 319-348. A study of immediate memory for numerals and nonsense syllables in ten boys and ten girls of ten years of age. Comparison is made with the results obtained from two men and two women under the same conditions. The material was arranged in rows containing from two to ten units. Special emphasis is laid upon individual differences in apprehending the rows, particularly when the number of units approaches the threshold.

PUBLICATIONS RECEIVED.

(Notice in this section does not preclude a more extended review.)

Annual Report of the Town of Southington, Connecticut. 1914. Pp. 102.

Contains the report of the superintendent, Ernest C. Witham, according to which the old-fashioned examinations have been abolished and standard tests are being introduced in their place. A graph shows the standing of the eighth grade in consecutive years as measured by the Courtis Tests.

LEONARD P. AYRES. *The Public Schools of Springfield, Illinois.* New York: Russell Sage Foundation, 1914. Pp. 152. Twenty-five cents.

The survey shows that the school board is attempting to attend to too many details, that the plans of even the newer school buildings are uneconomical and unhygienic, that there is inadequate knowledge of the exact number and status of scholastics in the city, that the teaching force gives evidence of inbreeding, that the medical inspection is insufficient, and that there is an excellent dental clinic. In determining the quality of classroom instruction a new series of spelling tests was used, the Stone tests in arithmetic were given, and the handwriting was graded by the Ayres scale. In these subjects the pupils showed approximately average abilities.

FRANKLIN T. BAKER, GEORGE R. CARPENTER AND JULIE T. DULON. *Primer. Language Reader Series.* New York: The Macmillan Company, 1909. Pp. 123. Thirty cents.

Prominent features of this primer are the use of Mother Goose rhymes, a large but rather light type, and numerous pictures in color. The authors had the advice and approval of Professor E. L. Thorndike in its preparation.

FRANK W. BALLOU. *High School Organization.* Yonkers: The World Book Company, 1914. Pp. xiv, 178. $1.50.

This number of the School Efficiency Series presents the findings of the School Inquiry Committee on the organization and administration of high schools in New York City. The book consists of a series of monographs on the following topics: Size of classes in high schools; work of chairmen of departments; work of other teachers; administrative control as it affects internal organization; estimating the number of high school teachers needed; and a summary of findings and recommendations by topics. The book is a constructive contribution to the organization of large high schools.

AZNIV BESHGETURIAN. *Foreigners' Guide to English.* Yonkers: The World Book Company, 1914. Pp. xi, 141. Seventy-five cents.

A conversation book along the lines of the natural method. Part I deals with objects and actions, part II with everyday life, and part III presents a series of reading lessons on practical topics.

ALFRED BINET AND TH. SIMON. *Mentally Defective Children.* Translated from the French by W. B. Drummond. New York: Longmans, Green & Co., 1914. Pp. xi, 180. $1.00 net.

The rapidly increasing interest in the application of the Binet scale of intelligence to the classification of school children makes this presentation of *"Les enfants anormals"* to English readers particularly opportune. The introductory chapter calls attention to the social nature of the problem, chapter II points out some features of the psychology of defectives, chapter III outlines the pedagogical examination and chapter IV the medical examination of defectives, and chapter V discusses the educational and social return which may be expected from the organization of special schools and classes for defectives. An appendix contains the Binet-Simon Tests of Intelligence.

ARTHUR A. BLANCHARD AND FRANK B. WADE. *Foundations of Chemistry.* Cincinnati: The American Book Company, 1914. Pp. 446.

A most attractive introduction to the subject of chemistry both from the standpoint of book-making (excellent paper, clear print, splendid illustrations), and from that of interesting subject matter presented in a simple and lucid style. The following paragraph from the preface throws a side-light upon the authors' views of formal discipline: "A tendency is now evident in secondary school education to depart from the study of the classics and to substitute therefor a multitude of vocational and informational subjects. It is extremely likely that this type of study will not only fail to prove as practically useful as its advocates hope, but that it will fail to impart that sturdy independence of thinking—that ability to apply what has previously been gained—which is so essential to success in all walks of life, and which can be imparted in large measure by a thorough study of the underlying principles of science in their applications to well-selected cases."

ELLA LYMAN CABOT, FANNY FERN ANDREWS, FANNY E. COE, MABEL HILL AND MARY MCSKIMMON. *A Course in Citizenship.* Boston: Houghton Mifflin Co., 1914. Pp. xxii, 386. $1.25 net.

This is a book for teachers and presents an outline or syllabus of a series of graded lessons in broad-minded thinking and upright living. The work is planned in detail for each month for each of the grades from the first to the eighth, and contains stories, poems, sug-

gestions for morning talks, and copious references for reading by both teachers and pupils. Judging by addresses before teachers' assemblies there is a general agreement that it is the duty of the schools to train pupils for citizenship, but the present book presents the most thorough and systematic effort yet made to render such training concrete, definite and progressive. There is a warmly commendatory introduction by Ex-president Taft.

MARY WHITON CALKINS. *A First Book in Psychology.* Fourth Revised Edition. New York: The Macmillan Company, 1914. Pp. xxi, 428. $1.60.

The fourth edition of this well-received introductory text gives unmistakable evidence of progress in the author's thinking away from the analytic, ideational psychology toward the standpoint of behavior. The chief task is still the analysis of consciousness into its elements, but consciousness is now conceived as "personal attitude" or "the self's relatedness to its objects," and the earlier view of the elements as obtainable only through the analysis of the "contents of consciousness," without regard to the self, is abandoned. A supplement to the bibliographies brings the references to the literature up to date.

EDWARD C. CHICKERING AND HARWOOD HOADLEY. *Beginners' Latin by the Direct Method.* New York: Charles Scribner's Sons, 1914. Pp. cviii, 140.

This is an attempt to apply definite psychological principles of language acquisition to the study of Latin. The direct method involves the use of Latin almost exclusively in the classroom as the means of communication between pupil and teacher, and as the means of expression of the pupil's thinking. The lessons are carefully graded so that from the first the pupil feels an increasing mastery of the language as an instrument of thinking. Yet the ultimate aim is not Latin conversation, but the ability to get the thought directly from the printed Latin page without the intermediary of any translation process. The authors rightly insist that translation involves a forcible injection of English thought forms between the perception of the printed characters and the comprehension of their meaning. What is now needed is the experimental study of the two methods in parallel groups, to determine step by step the psychological reactions of the pupils to each of the procedures, and to evaluate the results in terms of final accomplishment.

EDWARD S. CURTIS. *Indian Days of the Long Ago.* Yonkers: The World Book Co., 1914. Pp. x, 225. $1.00.

A series of delightful Indian tales told from the Indian point of view. The book is elaborately illustrated, and presents a faithful picture of Indian life that will make a powerful appeal to boys.

GEORGE V. N. DEARBORN. *Our Sexual Birthright.* Reprinted from Mind and Body, September, 1914. Pp. 215-223.

An impassioned and eloquent appeal to a popular audience for a saner and more natural education on the subject of sex relationships.

ROYAL BAILEY FARNUM. *The Present Status of Drawing and Art in the Elementary and Secondary Schools of the United States.* Bulletin No. 586. Washington: Bureau of Education, 1914. Pp. 375.

The monograph contains a discussion of the historical development of art education in America, an outline of the aims and scope of art teaching, and a detailed presentation of sample courses for rural schools, graded elementary schools, and high schools. There are 142 pages of statistics on the present status of art instruction, and 63 plates containing from one to four photographs each, illustrating art work done in different schools. In view of the lamentable deficiencies of American education along artistic lines, the monograph is an extremely valuable and helpful contribution to current educational endeavors.

BERNARD FLEXNER AND ROGER N. BALDWIN. *Juvenile Courts and Probation.* New York: The Century Company, 1914. Pp. xv, 308.

The authors aim to present a picture of the juvenile court as it exists today, and to indicate the lines along which they believe it will develop. They intend the book as a guide for judges, probation officers and interested laymen. "In its treatment of the child the juvenile court has fully justified itself, though it has almost wholly failed in its treatment of the adult responsible for the child's condition." In the future, instead of the child in court, emphasis will be placed on the family in court. The book discusses the fundamental principles of law underlying the court, the organization and procedure of the court, the functions of the probation officer, reports and statistics, and the forms used in prosecuting the work of the court. The appendix contains a sample draft of laws and rules of juvenile court procedure, and a list of selected references.

WILLIAM BYRON FORBUSH, and others. *Monographs of the American Institute of Child Life. The First Year in a Baby's Life.* Pp. 16. *Education of the Baby until it is One Year Old.* Pp. 12. *Education of the Child from One to Three.* Pp. 28. *The Second and Third Years.* Pp. 20. *The Dramatic Instinct in Children.* Pp. 16. *On Truth Telling and the Problem of Children's Lies.* Pp. 24. Philadelphia: Published by the Institute, 1913-1914. Fifteen cents each.

The above are samples from a list of twenty-five Monographs of the Survey of Child Life, ranging from eight to forty-eight pages each. They present in brief, popular form some of the more impor-

tant ideas of such authors as Preyer, Shinn, Tracy, Kirkpatrick, King, Major, and others. They can be recommended to mothers, nurses, kindergartners, and teachers who do not have access to the larger works, or would not be apt to read them if they had.

HENRY H. GODDARD. *School Training of Defective Children.* Yonkers: The World Book Company, 1914. Pp. xxii, 97. Ninety cents.

This is the report of The School Inquiry Committee on the ungraded classes in the New York City Schools. The author presents a survey of existing conditions in New York City, sketches what is done for children in ungraded classes, describes schoolrooms and equipment, discusses teachers and supervision of these classes, and concludes with a general consideration of the importance of the problem, and recommendations for its solution. One of the chief difficulties is the fact that the teachers selected for ungraded classes have been trained for work in the regular grades, and carry over with them the standards and expectations that they have developed with normal children. These standards, however, are not at all applicable to the defective children, and lead to a serious misconception of the function of ungraded classes.

HARVEY CARSON GRUMBINE. *Stories from Browning.* Boston: Houghton Mifflin Co., 1914. Pp. xiv, 338. $1.50 net.

"These studies are in no sense meant to be a substitute for the poems they sketch. They are intended for a stimulus and a help; and if to any degree they succeed in introducing the reader to Browning himself and in clearing away the cryptic and esoteric atmosphere which too much surrounds the conception of his genius in the popular mind, they have not been written in vain." The author has succeeded admirably, and has not only produced a book of charming stories, but has told the tales in such a way that the enterprising reader is filled with a desire to find out just how Browning himself told them.

C. GASQUOINE HARTLEY. *The Age of Mother Power. The Position of Woman in Primitive Society.* New York: Dodd, Mead & Co., 1914. Pp. 356.

In her previous book *"The Truth About Woman"* the author referred to the position of woman among primitive peoples, and defended the view that there was a time when the maternal rather than the paternal relationship was the most important one in society. The present book sets forth a more detailed argument in support of this contention, and tries to show why the paternal influence attained such dominance in historical times, and why the trend of thought today is swinging to the recognition of the biological and social significance of motherhood. With the further study and understanding of life processes and their relation to social welfare

and upbuilding, she believes that a new "age of mother power" will dawn, and that civilization will give as much attention to the development of the potentialities in the feminine half of mankind as it has been giving to the masculine.

JOSEPH LINDSEY HENDERSON. *Changes in College Entrance Requirements.* Reprinted from the Proceedings of the Association of Colleges and Secondary Schools of the Southern States, 1914. Pp. 12.

History shows that "colleges cannot successfully resist the demand for the acceptance of new subjects." They must assist in their development and standardization as they have done with the older ones, and they can do this by (1) providing adequately trained teachers, (2) aiding the schools in the organization of courses of study, (3) suggesting suitable equipment, and (4) carefully inspecting the work done.

EDWIN B. HOLT. *The Concept of Consciousness.* London: George Allen & Co., New York: The Macmillan Company, 1914. Pp. 343.

A most valuable discussion of the borderland field between philosophy and psychology.

UNA HUNT. *Una Mary.* New York: Charles Scribner's Sons, 1914. Pp. ix, 268. $1.25.

"This is the true story of the inner life of my childhood. It is the story of the life of any imaginative child, differing from others only in the details of the material which came my way and from which I built my life. * * * The life of Una Mary ended when I was fourteen years old. It was hardly a case of dual personality. I did not feel that I was two people. She was the rest of me, the deep, inner, real part that no one else seemed to know was there; the part of me that felt, felt with an intensity that was almost pain, a dumb ache of emotion." The story is splendidly told, and the book forms a valuable contribution to the literature of child biography, and will be of great assistance to parents and teachers in helping them to understand and appreciate the natures of sensitive children.

WALTER S. HUNTER. *The After-effect of Visual Motion.* Reprinted from the Psychological Review, Vol. 21, No. 4, July, 1914, 245-277.

The factors involved in the production of visual after-movement are retinal changes, association factors and strains in the occular muscles. Any one of these three may dominate over the others.

HORACE MEYER KALLEN. *William James and Henri Bergson.* Chicago: The University of Chicago Press, 1914. Pp. xi, 248. $1.50 net.

The author, who claims James as his philosophical master, and who enjoyed five years of intimate personal contact with him, points

out the likenesses and differences in the systems of the two thinkers. While James was very appreciative of much of Bergson's work, and agreed with him in many points, the author believes that the differences are much more striking than the resemblances, and that their fundamental conceptions of the nature of things are almost diametrically opposed.

PAUL KLAPPER. *Teaching Children to Read.* New York: D. Appleton & Co., 1914. Pp. viii, 213. $1.25 net.

The author disclaims at the outset any attempt to contribute to our knowledge of the physiology or psychology of reading, and professes that the book has been written solely with the desire to aid teachers who are "seeking a method that has stood the pragmatic test." Brief chapters sum up those experimentally ascertained facts in the physiology, hygiene and psychology of reading that the author considers important for the teacher, and these are followed by a discussion of such topics as when reading shall be taught, basic aims in reading, basic methods of primary reading, special modern methods of primary reading, subject-matter of primary reading, phonics, reading in the intermediate grades, and the teaching of a masterpiece. The discussion of the various methods is sound, and the recommendations to the teacher are psychologically well founded.

ELLA FRANCES LYNCH. *Educating the Child at Home.* New York: Harper and Brothers, 1914. Pp. vii, 214. $1.00 net.

In the preface we are told that "by writing this book in plain English it is hoped to reach two results: Firstly, to open the preserves of pedagogy and child-psychology to those who, though naturally most intensely interested in the subject, are deterred therefrom by the forbidding phraseology wherein it has hitherto been discussed and presented. Secondly, to help mothers to resume and do their sacred duty by their children instead of shirking it and delegating it to the school." There are chapters on how to teach poetry, English, spelling, arithmetic, writing and drawing, observation, the work habit, and the retarded child, but in all the chaff of rhetoric it is only here and there that we find a few grains of practical helpfulness.

CHARLES A. MCMURRY. *Handbook of Practice for Teachers. Practical Directions for Management and Instruction.* New York: The Macmillan Company, 1914. Pp. xi, 141. Sixty cents.

This little book, designed for use in normal and training schools, is the outgrowth of long practical experience in training teachers for elementary school work. It is packed full of practical suggestions on management, on the difficulties and growth of teachers, on the best methods of enlisting the co-operation of children, on lesson of points to emphasize and dangers to avoid. There are suggestions planning, on questioning, direction and control of attention, routine, waste of time, use of the study period, on general school problems,

and on each of the special subjects of the elementary curriculum. The young teacher will find this a very helpful and stimulating book.

GEORGE B. MANGOLD. *Problems of Child Welfare.* New York: The Macmillan Company, 1914. Pp. xv, 522. $2.00.

This is perhaps the best and most complete single volume on child welfare work available. "The author has attempted to present in a systematic way the principles of child welfare, and to correlate the different problems involved. The task consists mainly in adjusting the constructive philanthropy of today to the needs of the child, his improvement being the direct objective. While it is recognized that every social problem involves children, those questions that affect them only in an indirect way are excluded from the book, and the subject-matter is limited to the problems of direct and immediate interest, so as to make a consistent treatment of the subject possible." Part I deals with the conservation of life, and treats of birth rates, the waste of life, child mortality and its physiological and social causes, the milk problem, and various methods of preventive work. Part II discusses health and physique, including physical conditions of children, care of health, training of physical defectives, play and recreation, and wider uses of the schools. Part III is concerned with training and education, embracing mental classification, education of exceptional children, social aspects of education, industrial education and moral and sex education. Part IV treats of child labor, its causes, its effects, and the agencies for reform. Part V deals with juvenile delinquency, its causes, the juvenile court, the probation system, reformatory agencies, and measures of child protection. Part VI surveys the problems of dependent children, principles of child saving, and enumerates private and public child-saving agencies. There is a selected bibliography of 19 pages.

ROBERT MORRIS OGDEN. *An Introduction to General Psychology.* New York: Longmans, Green & Co., 1914. Pp. xviii, 270. $1.25.

This text differs in several respects from the ordinary introductory textbook in psychology. All psychophysical data are omitted, and the attempt is made to relate the discussion to the needs of the undergraduate who will perhaps take no further work in psychology, but may take further work in philosophy, education, sociology or biology. The author goes so far as to omit all diagrams, references to literature (except a brief list of readings at the end), and practical demonstrations. As a member of the "Würzburg School" the author gives the recent studies on the nature of the higher thought processes a prominent place in his discussion, and makes purposive direction and imageless contents salient features of his treatment. The book is divided into four parts: The problem of psychology, the analytic facts of mind, the synthetic facts of mind, and the issues of psychology. In the latter the chief emphasis is laid on personality and character, with a strong leaning to the bizarre and abnormal in personality.

MAUDE PARMLY. *Third Reader.* Cincinnati: The American Book Company, 1914. Pp. 211.

This book maintains the reputation for splendid book making, clear print, sumptuous illustrations and enthralling narratives established by its predecessors in the series. So easy and interesting are the stories, however, that one would think third grade children would read the book through in a week.

WILLIAM G. RAYMOND. *Plane Surveying.* Cincinnati: The American Book Company, 1914. Pp. 589.

An old and approved textbook that has been completely revised and rewritten.

WILLIAM PALMER SMITH. *Oral English in Secondary Schools.* New York: The Macmillan Company, 1914. Pp. xiv, 358. $1.10.

This is essentially a textbook in public speaking and reading, and lays the chief emphasis on the elocutionary aspects of the exercise. No attention is paid to oral composition. There are excellent detailed exercises for training in the pronunciation of difficult letter combinations.

JAMES MONROE TAYLOR. *Before Vassar Opened.* Boston: Houghton Mifflin Co., 1914. Pp. 287. $1.25 net.

This is an important contribution to the history of higher education of women in America. Introductory chapters deal with the collegiate education of women in the South and in the North before the Civil War, and the remainder of the book is devoted to a detailed account of the ideas and plans of Milo P. Jewett, the effect of these ideas upon Matthew Vassar, the organization of Vassar College, Jewett's election to the presidency, his estrangement from the founder, and the election of John R. Raymond as president, under whose direction the college was finally opened.

FRANK THILLY. *A History of Philosophy.* New York: Henry Holt & Co., 1914. Pp. xv, 612.

A sanely balanced, well written account of the development of philosophical thought from the Greeks to the Neo-realists. The changes in educational and phychological views receive due consideration, and over one hundred pages are devoted to the philosophical tendencies of the last century. There are copious references to the literature of each topic, so that the book is a useful compendium for the advanced student, while the style and arrangement are such as to make it a serviceable introductory work for the beginner. It is perhaps the only general text in the history of philosophy in which recent French, English and American contributions have received adequate recognition.

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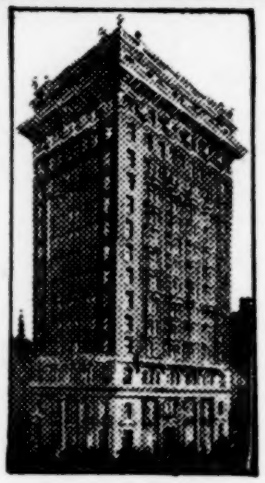

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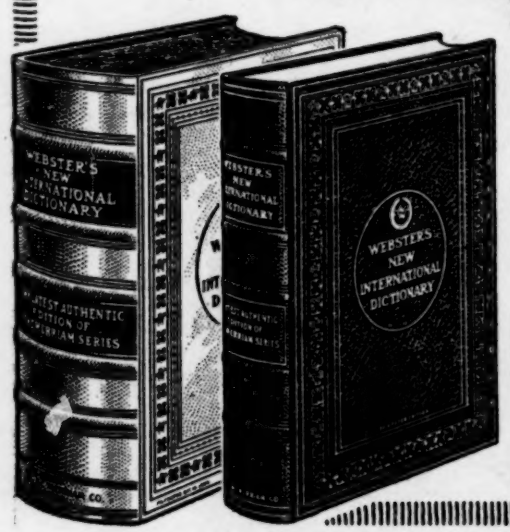

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ALICE C. HINCKLEY, Columbia University. *The Binet Tests Applied to Individuals Over Twelve Years of Age.*

The results of a study made at the New York Clearing House for Mental Defectives. The author finds that the difficulties of the Binet scale do not increase regularly with each year, but that there are decided jumps at varous points. There is an even greater irregularity in the difficulty of the individual tests within a given age-group.

HAROLD O. RUGG, University of Illinois. *A Scale for Measuring Free Hand Lettering.*

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In addition to these fairly distinct administrative fields there are those ove lapping problems of vocational education and of school extension, the one inclu ing agricultural education, and all varieties of trade, of continuation, part-tim and evening schools; and the other including broadly the problems of scho hygiene, of the school as a social center, and of the school's co-operative agencie

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